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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXII. No. 3127.] LONDON, APRIL 18, 1923. [75TH YEAR. PRICE 1s.

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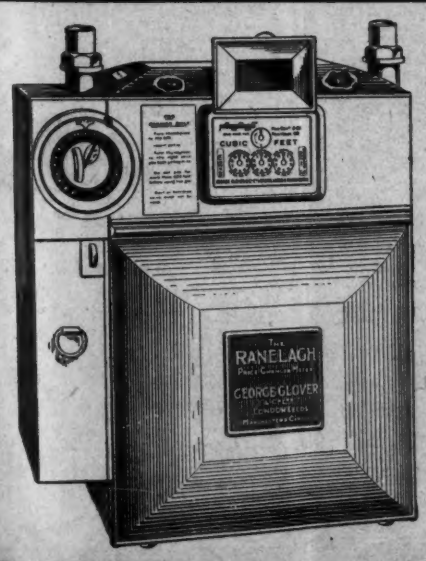

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VOL. CLXII., No. 3127.] WEDNESDAY, APRIL 18, 1923. [75TH YEAR.

EDITORIAL NOTES.

Local Authorities and the Gas Regulation Act.

THERE has been a deputation of representatives of municipal gas undertakings to the Director of Gas Administration of the Board of Trade (Mr. H. C. Honey), and there has been a conference at the offices of the National Gas Council—both on the subject of the position of local authority gas undertakings under section 1 of the Gas Regulation Act. Municipal authorities have not shown any particular eagerness to come under the Act; but of late two fresh considerations have risen to the surface which impel attention to the question of making application. The one is that those local authority concerns—only some twenty-five now—which are working under the Temporary Increase of Charges Act will not have the protection of that measure after Aug. 31 next; and the other is that the Therm Charges Committee deliberately recommended that all statutory gas undertakings should be brought under section 1 of the Act, which gives the Board of Trade compulsory powers in the matter if they think it desirable to exercise them. We imagine that, although the Board (as Mr. Honey told Alderman F. S. Phillips and his colleagues at the interview) have not yet arrived at a settled policy regarding this point, they will ultimately be influenced by the recommendation of the Departmental Committee.

However, as seen by the report in our news pages to-day, the interview and the conference have made clear the lines that municipal undertakings should pursue. Those who are working under the Temporary Increase of Charges Act, if they cannot carry-on under their former statutory maximum prices, should (as Alderman Phillips advises) make an immediate application to the Board for an Order; and Mr. Honey has promised there shall be no delay in issuing the necessary Orders. As to other local authorities, the Board would much prefer that they should come under the Act voluntarily; and as to compulsion, while the Director would not pledge the Board to any distinct policy, he said that no compulsory Order was likely to be made before Aug. 31 next. The position is that each municipal undertaking that has not made application for an Order must determine its own line of action in the matter; but we quite concur in the view of Alderman Phillips that gradually all municipal undertakings will have to come under the Gas Regulation Act. According to Mr. J. W. M'Lusky, the general opinion in Scotland is that Scottish municipal undertakings would be wise to apply for Orders under section 1. It would be a good thing if this were the opinion in the whole of Great Britain, for one of the objects of the Gas Regulation Act is to co-ordinate gas supply and testing conditions throughout the industry so far as statutorily controlled undertakings are concerned. That co-ordination, we feel confident, is bound to come about, whatever the current decisions of the municipal authorities.

The Belfast Arrangements.

GRADUALLY, but in good time, the arrangements are taking definite form for the Belfast meeting of the Institution of Gas Engineers towards the end of June. One now recalls the cordial and generous words with which nearly a year ago the then Lord Mayor of Belfast (Sir William Coates) personally in London invited the members to Belfast this year; and we know it has been a cherished wish of the President (Mr. James D. Smith, the Corporation Gas Engineer) that he should have the happiness of having his colleagues for their annual meeting in the city in which so much of his life's work has been carried on, and, as we all know, with great success. There are many ties between the work of the gas undertaking of Belfast and that of the gas industry in Great Britain. In the capital city of Ulster, technical gas progress has always been abreast of that anywhere else, and sometimes in front. The gas undertaking there has taken a good part in proving or demonstrating what can and what cannot be done. During the President's executive régime the history of advance has been unbroken, subject only to the unavoidable delays caused by war obstacles and industrial depression. However, the present Lord Mayor (Alderman W. G. Turner) is as enthusiastic about the visit of the Institution as was his predecessor (Sir William Coates); and this indicates that the warm-hearted place which we all have for the President in the gas industry exists equally in the civic circles of Belfast. The plans for the occasion show that the city authorities intend that the members of the industry from all quarters shall, while in Belfast, learn as much as possible of the city and its world-famed industries. There will be exemplification of the generous natures that preside over the local government in the character of the reception which will be accorded. At the first day's sitting, the Rt. Hon. the Lord Mayor will welcome the visitors, and in the evening there will be a reception at the City Hall. There will be pleasure, too, in learning that Prof. Morton, of the Queen's University, has consented to deliver an evening lecture.

The provisional technical programme, so far as developed, will include, after the Presidential Address, reports on the work of the Gas Investigation Committee. These will be in three sections, respectively treating of the Fairweather recording calorimeter, aeration in atmospheric burners, and the further examination of the blue and the carburetted water-gas processes. As customary, reports will also be submitted by the Refractories Materials Committee and the Life of Gas-Meters Committee. The Gas Research Fellowship report this year will be on the subject of "The Gasification "of Coke in Steam, with Special Reference to Nitrogen "and Sulphur." So far there are only three papers on the list; but we hope—in view of the interest that the Belfast gas-works, shipbuilding yards, and other works contain, and which will prove an immense attraction to the visitors—that there will be no attempt to inflate the technical part of the proceedings to its disadvantage. The papers are: "The Flow of Gas in Pipes," by Mr. Stephen Lacey, Distributing Engineer of the Gas Light and Coke Company; "Distribution in Belfast," by Mr. A. M. Cleland; and "Ammonia Yields from Vertical Retorts," by Mr. George Braidwood, of Coatbridge. These contributions will not cover any great amount of the area of current technical topic in the gas industry; but it is preferable to have a small quantity well presented and well considered than the opposite. We have a very strong belief in the usefulness, in these times of the expansion of the applications of gas, of members of the gas profession getting out and about, and seeing the work that is being done in other industries. The experience sometimes suggests where further extensions could be made in the utilization of our own primary product, and the best way of effecting it. However, we are looking forward to a highly successful meeting in Belfast, and to the members heartily supporting their President in making it so. Certainly no effort that will contribute to that object is being spared at the Belfast end. What promises to be very enjoyable, given good weather, is the excursion on the

last day of the meeting to the Giant's Causeway—a very suitable ending to the visit of the representatives of an industry of such gigantic proportions and accomplishing such universal service.

The Birmingham Medal.

The minutes of the last meeting of the Council of the Institution of Gas Engineers tell us that it has been unanimously resolved that the Birmingham Medal shall be awarded to Mr. W. Doig Gibb, O.B.E., M.Inst.C.E., and Past-President of the Institution. We heartily congratulate Mr. Doig Gibb on this unanimous decision of his colleagues to confer on him the one further honour which comes within the compass of their power. To have one's name enrolled with those of Livesey, Siemens, Hunt, Newbigging, Perkin, Valon, Welsbach, Helps, Woodall, and West, is an honour indeed; for those are names that project, through their work and deeds, in the records of our industrial progress. Mr. Doig Gibb has proved himself a sound engineer, gas administrator, and adviser. But we must regard the selection for this distinction as being largely due to that self-sacrificing work that he did, in the main without pecuniary recognition, during the war as Technical Adviser to the Department of Explosive Supplies, and in several other capacities in which his intimate practical knowledge of the gas industry enabled him to render service in adjusting the balance so that it did not turn unfairly against the industry, or in advising the modification of conditions that, harsh as they may have seemed at the time, would have been worse still without friendly intervention "at Court." It is impossible to appreciate to the full how, through words in season, counsel the other side of closed doors, and in other ways, service of incalculable value was rendered to the industry during those years of stress. It was something to have behind the scenes, moving about in new surroundings and the unusual influences and workings of bureaucratic life and Governmental procedure, someone who so strongly commended himself to his then new associates, and who at the same time was held in such high respect by the gas industry. We are told that one cannot serve two masters; in this case, our friend was able to serve two interests well because of his intimate knowledge of the ability and capacity of the one, and of the requirements of the other. Though we cannot appraise fully the work done by him on behalf of the industry, we realize that it was vastly important; we intuitively know what we cannot absolutely define. Mr. Doig Gibb is worthy of this recognition; and we rejoice that the members of the Institution have endorsed the recommendation of their Council. There are other men whose work entitles them to similar recognition—men who have done much, and are doing much, to advance the interests of the industry. We will not mention them by name; they are well known. They must not be overlooked; they cannot be. But as early as possible in the days of peace, the man who stood, when there was no peace, so well and fairly between official decree and the interests of the gas industry deserves the honour of the Birmingham Medal. At Belfast he will receive it.

Technical Investigation in Australia—Storage and Consumption.

Technical investigation into gas-making processes is not confined to this country. It goes on all over the world where there is gas supply, and where there are progressive gas men who want to realize the maximum efficiency in their own operations. We admit fully and freely that all are not of that particular "build." Enthusiasm, inclination, and ability vary widely as between man and man. Some research work is of importance to gas supply wherever the location; other investigation is carried on with the view to doing the best in local circumstances. But it is all to the good. In other parts of the world, climate, labour, coal and oil availability, and coal quality, and other considerations all come in to cause differences in gas research work; and yet, whatever the conditions, it all has the one objective. For long in certain of our Dominions, gas practices followed closely upon those of the Mother Country; but men of high-plane training have taken their place in the work there. To see one indication of this, we need only read the address which Mr. H. Tindale, of the Australian Gas Light Company, delivered to the New South Wales and Queensland Gas Institute, at the last meeting. In this he lifts the curtain upon the work that the staff of the Company are doing, at the instigation and with the encouragement of the chief (Mr. Andrew Wilson), in helping to solve problems which concern the whole technical gas world; and they are proceeding with the work with the quiet confidence of those who believe that those who seek shall find.

We have recently had evidence of the progress of the Australian Gas Light Company in Mr. R. J. Milbourne's book on their 12½ million c.ft. holder, which shows the breadth of view that exists at the Company's headquarters in regard to the economics of storage on a large scale in one vessel, within the limits of requirement and prospect. Mr. Tindale's address treated of several matters. It showed that Australia is well in line with front-rank adoption of processes, &c. It seems hardly possible that a decade can have passed since continuous vertical retorts were first installed there; and yet it is true. And the ten years' experience under local conditions leads Mr. Tindale to assert that the system "is more suitable than any other to a climate such as ours." In other words, it has definitely established its superiority, particularly in low operating, repair, and maintenance costs. This is interesting. Labour costs in Australia are not by any means on the light side; and the point as to repair and maintenance costs shows that experience in this country has been repeated in far-away Australia. In referring to low costs, of course, Mr. Tindale is speaking relatively to those produced by other systems. His statement means that the capital expended produces economies in the three directions of operating costs, repair, and maintenance, and we suggest in thermal productivity as well. The balance of advantage must be on the side of the investment, or Mr. Tindale would not have spoken in such positive terms as to the system having definitely established its superiority under local conditions. Right up to the times, a complete gasification plant has been installed at Bathurst. But there is one thing the President deplores. It is that the General Gas Act under which gas undertakings operate in New South Wales does not permit of full advantage being taken of recent gas-manufacturing developments. This is a pity. Legislation should never put a restriction on the attainment of the best public service; on the contrary, it should facilitate it. Therefore it is to be hoped that the necessary amendment of the Act desired by Mr. Tindale will be made at an early date, so that every economy may be utilized which can be brought to bear upon the cheapening of the supply of thermal units to the public.

There is promise of additional interest in what the President had to say regarding the research that has been proceeding at the works of the Company in connection with the purification of gas—from condensation through to the oxide purifiers. The workers in this direction have been many; but the fact remains that even now perfection cannot be claimed in connection with any of the processes. There are problems still unsolved; but from what Mr. Tindale says, it would appear that Mr. Wilson and his staff have been working so industriously at them that they have confidence the experimental data they have accumulated will contribute substantially to improvement in existing practices. We hope sincerely that this will prove to be so. It is claimed for example that in the experimental condenser the rate of heat interchange has been increased in a most remarkable manner; and what has been learned in this respect has been put into practice in a new battery of condensers designed to cool 2¼ million c.ft. of gas per day. We have to await the details; the President having a preference for realizing facts before speaking too precisely. There is also discussion of the process of washing and scrubbing—the importance of recovering stronger liquors; the susceptibility of the process to the effect of heat; and as to the reduction of efficiency if the temperature of either the gas or air exceeds 75° Fahr. These and other points raised we imagine indicate the direction in which research has been pursued at the Mortlake works of the Company, with a view to determining the efficiencies of the washing and scrubbing plant. Here, again, there is promise that an improved type of washer-scrubber can be evolved, which will be of less cubical capacity than those now installed, and of such construction as to permit of the production of a liquor of greater strength than that usually made. In connection with oxide purification, though the process is simple, investigation has manifestly persuaded Mr. Tindale that it is preferable not to put down purifiers of extensive capacity for the mere purpose of carrying sufficient oxide to keep them running continuously for a great

length of time. He prefers smaller plant, and the immediate removal of the oxide after sulphiding.

The next section of the address treats of the subject of the relation of output to storage; and it is clear that in this connection (as, in fact, the President acknowledges) the lecture that we published on "Gas Distribution" by Mr. Stephen Lacey, Distributing Engineer to the Gas Light and Coke Company, in the "Journal" for Dec. 22, 1920, has greatly influenced the investigation of this subject by the engineering staff of the Australian Gas Light Company. The Company (and this is a general experience in Australia) have been having an increase in the consumption of gas approximating to 7½ p.ct. But the changed character of the load has given rise to much consideration, as well as the effect that it has on gas-storage accommodation. It is most interesting to note that the increase in the day load in Australia during this century has reduced what Mr. Tindale calls the "storage factor" from about 35 p.ct. to about 22 p.ct. of the daily output of gas. This affords a very close parallel to the experience of the Gas Light Company, which Mr. Lacey gave in graphical form in the lecture already referred to. In practice, of course, as Mr. Tindale points out, the storage necessary is several times greater than the minimum —*i.e.*, the storage required to balance the variations in rate of demand in any one day. The amount of storage required in excess of the minimum would appear to depend upon three factors:

(1) The variations in output on different days of a normal week.
(2) The variations in output due to changes in weather conditions such as may be produced by sudden cold or fog.
(3) The flexibility of the carbonizing plant as regards output.

In this country, sudden and unexpected change in weather conditions is to-day the factor of greatest importance in the determination of the amount of storage necessary. With many gas undertakings the increase in consumption, due to a sudden fall in temperature, is proportionately as great as the increase which used to be brought about by fog (say) thirty years ago. It is impossible to lay down any hard-and-fast rule as to the relation between output and storage. Every case requires special treatment. But one can say that before spending money on increasing storage capacity, it is well to consider very carefully what can be done in increasing the flexibility of the carbonizing plant as regards output. There is another aspect of the question. An ample storage capacity will enable a gas undertaking to reduce Sunday work to a minimum; but we should think that the conditions would have to be altogether exceptional to make it worth while to incur the expense of providing additional storage for this purpose. In every part, Mr. Tindale's address is highly interesting.

Gas Heating Values and Consumptions.

The more the study made of the conditions and uses of gas supply to-day, the more we are being persuaded that the lowest attainable price for gas is only one factor in good service, and that it is not the most important. When one considers that consumers, through careless adjustment and use, waste so much gas, it is seen that they wantonly and quickly soon wipe-out all the advantage that a reduction of price should give them. They themselves (there is proof on all hands) create the discontent which causes them to complain of high gas bills, though they are ready enough to attribute it to the quality of the gas rather than to their own mismanagement. This perhaps is only human; but it is not pleasant to the gas suppliers. They work for economy in production to lower the price of therms to the consumer. That is good; but the consumer will be the better served, and his expenditure for gas will be lessened, if in the price as charged to him there is something retained for expert inspection, adjustment, and advice. And the interests of the industry itself will similarly be the better served. The consumer does not consider so much the price per therm as the total of his account; and the total for the service rendered is the seat of either satisfaction or dissatisfaction. It is therefore to the interest of a gas undertaking to help to keep the total of each consumer's account as low as possible; and a more effective way than a rock-bottom price for gas is to ensure proper and economical use. In America, there has, as here, been a movement to lower heating values per cubic foot of gas. This has brought about material savings and reduced prices; but here and there consumers have complained that, in the result, they have had to spend more on gas. Investigation has proved that this is an unnecessary result.

To decide an economic and satisfactory heating standard for Baltimore, the Public Service Commission of Maryland have had an investigation into the question, and in this they have been aided by research work carried out by the Bureau of Standards on mixed gases of varying quality—coke-oven gas, coal gas, and water gas enriched with differing proportions of oil. A review of the report on the research appears in later columns; and it is interesting to us, as in it there is, from a wholly disinterested quarter, confirmation of the result of the work of our own Gas Investigation Committee —that with gases of varying qualities and compositions there is a close similarity of efficiencies, when there is equality in the total supply of heat units for any particular purpose, which is proof positive that, if the heat units are supplied at an equal price, the fault for any increase on a lower thermal quality of gas being supplied lies with the consumer through misuse or extravagance. If the heat units with the lower thermal quality of gas are supplied at a reduced price, then the gas accounts should show a proportionate reduction, given parallel use. The American tests were made with three types of hotplate burners, but principally with the "star" type, which is most extensively used in Baltimore. Adjusted to a consumption rate of about 9000 B.Th.U. per hour, all the different gases, irrespective of the kind of gas or B.Th.U. content per cubic foot, gave a constant efficiency of about 37 p.ct.—the range of heating values used in the tests being from 300 to 600 B.Th.U. We cannot compliment Baltimore upon the efficiency of the boiler burner most prevalent among the gas consumers there; it is not good, comparatively with the efficiencies obtained here with modern burners. However, the efficiency did not vary much up or down with a change of 2000 B.Th.U. per hour from the datum line of 9000 B.Th.U.; but the time taken to do the work varied. Still the tests proved, as other tests have done, that the efficiency of heat absorption varies only slightly with change in the rate of heat supply, and therefore that the speed of heating varies almost directly with the rate of heat supply.

The next point is as to the change in specific gravity caused by varying the proportions of mixed gases. The finding is just as it has been in this country—nothing else being expected—that, provided satisfactory and uniform pressure conditions can be maintained, it should be possible, by correct adjustment, to secure reasonably good service with most domestic gas appliances, even with considerable variation in specific gravity. This leads to the only possible general conclusion—that the burners in existence can be adjusted to give satisfactory service over a wide range in heating value; the slight differences in behaviour of different mixtures of gases not being of sufficient moment to have much weight in any consideration of their relative merits for use in domestic appliances. Naturally the less variation there is in heating value, composition, specific gravity, and pressure, the easier and better can be the adjustment, and the more satisfactory the service to the consumer.

There is one part of the report which bears upon the waste of gas by consumers; and it is interesting, in view of the agitation in this country which caused the therm to be placed in the dock, only subsequently to be released without a stain on its character, but, on the contrary, commended by an impartial tribunal for application throughout the limits of statutory gas supply in the country. The reporters make a point which shows the importance to consumers of adjusting their gas-taps to requirements, and keeping the lids on utensils when heating operations are proceeding. We know that consumers have some extraordinary practices in connection with gas use. The investigators have been testing to see what happens; and what happens is highly wasteful. They find that, with the gas full on and a lid on the utensil, violent boiling consumes about nine times more gas than is necessary to maintain gentle boiling; that for gentle boiling about five times as much gas is used with the lid off as would be required if a lid were on the utensil; that when violently boiled, the water evaporates at about the same rate with the lid on as with the lid off; and that gentle boiling evaporates water about six times as fast with the lid off as compared with the lid on. These findings indicate one common source of waste; and they ought to be included in the advice given to consumers as to the rules that should be followed in order

to economize. Another point is as to the placing of utensils so close to the burner that there is cone contact. This ought not to be left to the regulation of the consumers; it should be provided against in the construction of the hotplate. With burners properly located and adjusted, and normal rates of consumption, the danger from carbon monoxide production is remote; but there is not always the proper location and adjustment. The confirmatory character of the American research results as to those obtained in this country is the greatest value of the report; otherwise, it does not disclose anything that is new, in view of the precedent investigation here.

British Empire Exhibition.

The first step has been taken to secure the representation of the gas industry at the British Empire Exhibition in 1924. The electricity industry is developing very big plans; and it is hoped that the British gas industry will make a "worthy" display. We should like to emphasize the word "worthy," as the gas industry should see that its imposing character in the service of the country is not belittled or misrepresented on the occasion by any inadequacy. In later columns, brief account is given of the result of a joint meeting of the central gas organizations to consider the matter; and the names of those who will represent the gas-supply side of the industry are given. Later on the names of the representatives of the Society of British Gas Industries will be available for publication.

Gas Bills and Section 1 of the Gas Regulation Act.

The Unopposed Bills Committee of the House of Commons have now announced their policy in respect of the fixing of standard prices under section 1 of the Gas Regulation Act. They are not going to refuse to endorse prices asked for; but if promoters cannot satisfy them that there has been proper investigation, then they will refer the matter to the Board of Trade. This is a very proper attitude. The matter came up on the consideration of the Hoylake and West Kirby Gas and Water Bill; and Sir Ernest Moon, K.C., Speaker's Counsel, gave expression to the views of the Committee on the point. The Board of Trade had asked the Committee to satisfy themselves that the proposed price was one which would be justified *at the present time*, if fixed in accordance with section 1 of the Gas Regulation Act. The Committee confess that they have neither the materials nor the necessary machinery to enable them unaided to come to a satisfactory conclusion upon an intricate matter of this kind. If, however, they find that there has been a real investigation, and that those who have held it have been advised by competent people, then they will accept the decision agreed upon by the parties; if not satisfied as to this, then the matter is to be referred to the Board of Trade for a determination of the price. This then indicates the course that promoters of Bills must take if they wish to include a standard price in a Bill, and not have to wait for a decision by the Board of Trade. In other words, the price must be an agreed one; and the Committee, having regard to the interests of the consumers, must be satisfied that there has been a thorough investigation. When the Hoylake Bill was introduced, a standard price of 18·5d. per therm was suggested; but the position and the outlook changed. By the time that Mr. W. Doig Gibb, on behalf of the Company, and Mr. Arthur Valon, on behalf of the local authorities, came into conference over the schedule of costs, reductions were possible; and a review of the schedule item by item made the acceptance of 13·6d. quite practicable. This collaboration between the experts on both sides resulted in an agreement that the amended figure is a reasonable one—at the present time. The Bill has been altered accordingly; and the Committee have ordered it to be reported for third reading. Other points were raised during the discussion; but they were of minor character, and are noticed in our report under "Parliamentary Intelligence." Of course, the standard price can be reconsidered at any time by the Board of Trade, under the conditions laid down in the Gas Regulation Act.

Labour Troubles.

The troubles in the industrial world have undergone a vast change during the past week. There seems to be more reasonableness in the air, except in connection with the agricultural dispute, in which we cannot help dividing our sympathies. Fortunately for the whole country, the threatened stoppage in the building world has been averted. The employers withdrew their notices on an agreement that interpretation of the National Wages and Conditions Council document and the question of wages should be referred to arbitration—the arbitrator to be appointed by the Lord Chief Justice, together with two assessors, one to be appointed by the operatives, and the other by the employers. On the question of hours, a ballot is to be taken regionally by the operatives. Failing regional settlement, the matter is to be referred to the National Wages and Conditions Council for decision. Again, failing an agreement, the matter is to go to arbitration, before the same tribunal as the question of wages. The settlement is regarded as a fair one. As to the proposed reduction by 6s. 6d. of the war bonus of the railway shopmen, Mr. J. H. Thomas has advised that it be submitted to the Railway Wages Board; and there appears to be a growing feeling in favour of putting in motion the machinery of conciliation. Everybody hopes for a peaceful conclusion.

Raw Materials Prices.

It is evident that grave concern exists among manufacturers regarding the all-round difficulty now being experienced in obtaining raw materials, and the marked and continued rise in prices. Developments in the Ruhr, the boom in American trade, and also a decided improvement in our home and export trade seem to have caused almost a famine in pig iron, coke, and coal; and, in the last few weeks particularly, the prices have nearly reached the 1920 figures. Already the reaction has been felt throughout the metal market, as the following comparative table of prices will show:

	Nov., 1922. £ s. d.		March, 1923. £ s. d.
Cleveland pig iron	4 12 6	..	5 17 6
Bar iron	11 10 0	..	13 10 0
Mild steel bars	8 10 0	..	9 10 0
Foundry coke	15 p.ct. advance; still rising.		
C.R.C.A. sheets	11 10 0	..	13 0 0
Copper	63 0 0	..	73 0 0
Tin	184 0 0	..	211 0 0
Gas barrel	60 p.ct. and 5 p.ct. off list.	..	57½ p.ct. off list.
Brass tubes	0 1 0	..	0 1 0¾
Copper tubes	0 1 1¼	..	0 1 2¼
Brass ingots	Price is rapidly rising, largely the result of there being no further supplies of war munition swarf.		

Coal also is causing anxiety; and prices have moved rapidly upwards. Costs for finishing iron and steel have risen in sympathy; and buyers are becoming extremely careful. It is felt generally that, as there seems little hope of the position improving in the near future, manufacturers are faced with much lower prices for their goods this year as against last year, *plus* increased cost of materials; and unrest is apparent on the wages question. It would seem, therefore, that buyers should place their business before advances have to be made, as, if no reduction takes place in materials, higher prices than now ruling seem to be inevitable. One of the largest makers of cast-iron and gun-metal pipes and valves has already announced an increase; and it may not be long before the example is followed generally.

London Electricity Scheme.

The opposition on legal grounds to the scheme of the Electricity Commissioners for the reorganization of the supply of electricity to London and the Home Counties Electricity District has not gained any further success. Two *rules nisi*, it will be remembered, were obtained against the Electricity Commissioners—one for a writ of prohibition, and one for a writ of certiorari. The rules were granted on the ground that the scheme rendered it compulsory on the Joint Electricity Authority to delegate to two Committees the powers and duties of the Authority; and this proposal, it was said, was *ultra vires* the Commissioners and the powers conferred by the Electricity Supply Acts of 1919 and 1922. The matter came the other day before a Divisional Court constituted of the Lord Chief Justice, Mr. Justice Avory, and Mr. Justice Roche; and the rules were discharged. From the remarks of the Lord Chief Justice, it is seen that the Court were of opinion that the scheme would have to go very much farther before the time would come, and the scheme was in a condition, for taking

steps to make a pronouncement on the question of validity. For example, as the scheme develops, there will be many opportunities for reflection by the Ministry of Transport; and either House of Parliament might in the result refuse to accept it. A condition of things, his Lordship held, was being dealt with here that was of an inchoate and embryonic order. This stage, therefore, was not, in the opinion of the Court, the one in which there should be prohibition or certiorari. The other Judges agreeing, the rules were discharged. The objectors' intention, of course, was to secure a decision of the Court on the question of validity before all the expense of inquiry and other contingent proceedings was incurred.

PERSONAL.

Sir RICHARD T. GLAZEBROOK, K.C.B., M.A., D.Sc., F.R.S., who was the first Director of the National Physical Laboratory, has been elected an honorary member of the Institution of Civil Engineers.

The Gas Committee of the Walsall Town Council have recommended that Mr. FRED. DAVIES, Assistant Gas Engineer, be appointed to succeed Mr. B. W. Smith (who is retiring) as Manager of the undertaking. The salary accompanying the appointment is £600 a year, rising by four annual increments to £700, with house, coal, and gas free.

The Directors of the Wakefield Gas Light Company, after very carefully considering the ninety applications for the post of Engineer and Manager, vacant owing to the impending retirement of Mr. H. Townsend, M.Inst.C.E., have unanimously appointed to the position Mr. C. W. WARD, Assoc.M.Inst.C.E., the Engineer and Manager of the Corporation Gas-Works, Brighouse.

Mr. H. S. ASPINALL, who recently resigned his appointment as Sales Manager and Director of the Keighley Gas and Oil Engine Company, Ltd., has been appointed General Sales Manager to Messrs. Vickers, Petters, Ltd., of Ipswich Works, Ipswich, manufacturers of vertical two-cycle oil-engines for stationary and marine purposes. Mr. Aspinall's headquarters will be at Messrs. Vickers, Petters' works at Ipswich.

At the Sun Hotel, Shipley, last Thursday, Mr. JOHN WILLIAM RHODES, Chief Clerk to the Shipley District Council Gas Department, and Mr. ROBERT SHAW AMBLER, Collector, were presented with gold watches, in appreciation of their long service with the undertaking—first when it was the property of the Shipley Gas Light Company, and subsequently under the District Council. Mr. Rhodes has had 47 years' service, and Mr. Ambler 49 years. The former has recently retired, and the latter is to do so shortly. The gathering was attended by the Chairman and members of the Gas Committee, by Mr. H. Burton (Engineer and Manager), and by practically all the staff and workmen.

The Directors of the Sheffield Gas Company have appointed as Chief Accountant Mr. F. L. WATSON, A.C.A., in succession to Mr. Herbert Seagrove, who is retiring after 27 years' service with the Company. Mr. Watson, who was educated in the North of England, served his articles in Middlesbrough, and in 1908 qualified with honours as a chartered accountant. For the last 12½ years he has been associated with Messrs. Cash, Stone, & Co., whose senior partner, Mr. William Cash, the President of the Institute of Chartered Accountants, is so well known in the Gas Industry, both as a Director and Auditor, and also in connection with the assistance he has rendered to the industry with regard to parliamentary matters. Mr. JOHN T. MEAKIN, Chief Cashier, who has been in the service of the Company for 33 years, has been appointed Assistant Accountant.

The feelings of horror with which the news has been received throughout the country of the latest Indian Frontier outrage will be intensified on the part of those connected with the gas industry by the knowledge of the fact that Mr. J. H. Ellis, the popular Chairman of the Plymouth and Stonehouse Gas Light Company, is so nearly related to the victims. According to an early account of the occurrence appearing in "The Times," Mrs. Ellis, the wife of Major J. V. Ellis (who is the son of Mr. J. H. Ellis), and her daughter Molly, seventeen years of age, were living in a bungalow at Kohat next to that of the General Commanding the station, which has a military guard; and in the absence of Major Ellis, an attack was made in the night by raiders, who murdered Mrs. Ellis and carried off her daughter. With the deep sympathy that will be felt by all with the family in their trial, will be allied an ardent hope for the early rescue of Miss Ellis.

OBITUARY.

WILLIAM CHEW.

As was briefly announced in last week's "JOURNAL," Mr. William Chew, the Blackpool Corporation Gas Engineer, collapsed at the Town Hall, on Monday, April 9, and passed away a few minutes later.

Deceased, who was aged 67, intended to be present at a meeting of Heads of Departments. He was accompanied by his only son, Mr, John H. Chew (Deputy Gas Engineer and Manager), and complained of not feeling capable of going into the meeting at the time. His son realized that the attack was serious, and assisted him to the smokeroom. Hardly had Mr. Chew got into a chair, when he died. Five years ago, he had an attack of pneumonia, and never regained his former robust health.

Mr. Chew's connection with the Blackpool undertaking covered half-a-century. He was appointed Assistant Engineer there in 1873, when the output of gas was 20 million c.ft. a year. In 1913, when Mr. Chew was appointed to succeed his father, Mr. John Chew, as Engineer, the output was 670 million c.ft. From 1879 to 1892, he was also Engineer to the Corporation's electric light department—Blackpool having been a pioneer in the electricity supply. He was a member of the Institution of Gas Engineers, of the Manchester and District Institution of Gas Engineers, and of the Institution of Electrical Engineers. He did considerable consulting work in respect of gas, electricity, and architecture in various parts of the country. By his sudden death, the town of Blackpool loses a fine citizen and a faithful servant. Under the management of the family of Chew, the gas undertaking has prospered greatly.

Deep sympathy is extended to deceased's widow and only son.

ELECTRICITY SUPPLY MEMORANDA.

Fuel and Generation.

IN a compilation of statistics issued by the Electricity Commissioners, it is seen that the total number of units of electricity generated in Great Britain during the year ended March 31, 1922, was 4,884,666,038; and the coal consumption was 6,595,255 tons. Assuming the coal had an average calorific value of 13,000 B.Th.U. per lb. (which is putting it rather high) the expenditure of fuel was 3·024 lbs. per unit, which represents an efficiency of only 8·7 p.ct. It is, on this assumed calorific value, worse than that, inasmuch as, in addition to the tonnage of coal, there has been no allowance made for oil, water power, and other subsidiary methods of generation. It is not even clear whether the large quantity of gas coke now used under steam-boilers is included. Converting these other fuels and water power into the equivalent of coal, an appreciable difference would be made to the average expenditure of fuel per unit generated. In gas-producer stations the average fuel consumption per unit generated is 2·64 lbs., and in oil-engine stations 2·08 lbs. The question of what is possible in generation is receiving increased attention just now. It is recognized that there are limits to the size of generating plant, at which no further fuel economies can be effected; and there is a growing view among electrical engineers that any extra gains a super-power station might produce upon present best practice would be lost in transmission costs, if supply were given over a large area, with a mixed density of population and a poor demand at the extremes of the distribution system.

Boiler Efficiencies.

Bearing upon this subject of generating efficiencies, Mr. David Brownlie recently contributed an article to the "Electrician" on the subject of the remarkable guarantees which some boiler makers are now giving for new plants. The efficiency of the boiler plant has, of course, some effect upon the fuel expenditure per unit of electrciity generated; but it is only one stage in the work of production, and not the one where the maximum thermal loss occurs. But the steam-boiler makers have to do their part in securing the steam-engine from dethronement in view of the higher efficiencies of internal combustion prime movers. Mr. Brownlie has had an efficiency specification for a boiler plant for one of the latest power stations which gives a guarantee of 85 p.ct. net working efficiency—corresponding to about 88½ p.ct., according to the ordinary methods of calculation. Mr. Brownlie says that the 85 p.ct. is for the whole installation working at 60,000 lbs. evaporation per hour, after deducting the power absorbed for induced and forced draught and the mechanical stoker. This is not to exceed the equivalent of 1½ p.ct. of the total evaporation of the plant, and is to be calculated on the basis of 1 KW. generated for 18,900 B.Th.U. The over-all figure is, however, still more remarkable inasmuch as it is distinctly specified, first, that a comparatively low-grade coal has to be used (10,800 B.Th.U. per lb., with 28 p.ct. volatile matter); and, secondly, the higher heating value has to be taken—that is to say, the figure by direct combustion in the oxygen bomb calorimeter, without any deduction for the hydrogen content of the coal. The difference in this respect, with a normal 3 to 4 p.ct. of hydrogen in the coal as fired, probably corresponds to 3 to 3½ p.ct. in the efficiency—that is to say, 85 p.ct. efficiency on the higher value is about 88 to 88½ p.ct. on the lower value, with at least 300 to 350 B.Th.U. per lb. of coal difference. This criticism by Mr. Brownlie suggests that, if coal was of higher quality than 10,800 B.Th.U. per lb., and the ash and moisture were low, then the efficiency would reach a surprising figure for solid-fuel fired boilers. There is comment, too, by Mr. Brownlie on the startling exit temperatures. He says he should not like to attempt to draw up an effective agreement between the parties on the matter. And while he is delighted to hear 85 p.ct. real efficiency is even being talked about (in view of the fact that the average steam generation of Great Britain is less than 60 p.ct., and the average power-station boiler plant is probably not 70 p.ct.),

there is scepticism in his wish for "good luck" to the firms in question, and his observation that, if they exceed 80 to 82½ p.ct. efficiency with the quality of coal specified, they will have done well—in spite of the latest methods of design, particularly air heating, and the very low radiation losses owing to the design. The article then goes on to discuss the methods of boiler-plant testing, which question is raised in very acute form by the approach of these super-station guarantees. Mr. Brownlie maintains that, with any of the present codes, it is not possible to come to any definite agreement as to what is the exact meaning of 85 p.ct. efficiency; and the Institution of Civil Engineers' code in particular is simply hopeless in this connection. This code, however, has been thrown over by the contracting parties in this particular instance.

Street Lighting and the Rates.

We have not the slightest objection to a reasonable amount of expenditure on good street lighting—"reasonable" in relation to attractiveness and utility, which latter word includes safety. What we do object to is a large needless expenditure on the conversion of public lamps from gas to electricity, when the gas-lamps could be modernized at a much lower outlay, and the efficiency be improved without adding to the running cost as compared with the less efficient lamps that are displaced. Mr. Charles J. Stahl, of the Westinghouse Company of America, has been writing on the subject from another point of view. There is no doubt he has electric lighting in mind; but what he has to say applies equally to street lighting by gas as to the same service by electricity. He views the matter from the standpoint of the higher rates for the service; and he holds that there is no justification for making comparison of the lower costs of past service and the higher costs of the present. The old standards of lighting have passed, or should have done so in all progressive communities; and the purchasing power of money is less. As our plane of living advances, our governmental expenses must go up. The rates that are necessary must be accepted in order not to fall behind in public improvements. That is quite true; but what is not reasonable is that rates are sometimes inflated by so-called "improvements" that are not necessary. In this matter of street lighting to-day, so many of our public authorities are influenced by possessing an undertaking trading in electricity. They then often take the most expensive route to "improving" the street lighting; and sometimes it is not an improvement. We agree with Mr. Stahl that good street lighting is a civic economy; also that the tradesman in a well-lighted street occupies a better position than the tradesman in a poorly lighted one; for people are attracted to the former. But the unfortunate tradesman in the poorly lighted street has to pay his share of the cost of the good lighting which benefits his competitor. This is not equitable; but he has to put up with it. There is no denying the argument that good lighting means greater safety; and there is more reason to-day than ever that lighting should be considered in relation to safety, from the point of view of every menace.

The Unsuitable Fitting.

There are some types of lighting fittings that can be used satisfactorily, and with advantage, with the incandescent gas mantle, but which are not suitable for incandescent electric lamps, owing to the much higher intrinsic brilliancy of the latter. "Megohm," in the "Electrical Times," makes quite a good point as to this, in respect of the counterweight pendant. He wonders why illuminating engineers have not made a "virulent" attack on this class of fitting, seeing that by pushing it up and down the whole carefully designed scheme of illumination so far as candle-feet calculations are concerned is shattered to bits. But we do not object to this so much as to the fact that the alteration of level of the lamp must, unless special provision be made against it, alter the angle, and so at times bring the filament more directly into line with the visual organs. The point that "Megohm" makes is not a particularly strong one, inasmuch as people's eyes differ in strength, and work changes in its characteristics—some work requiring a stronger light than other forms. Small and large type, different coloured fabrics, fine needlework, knitting, and much else—each claims more or less light. A counterweight pendant and a gas-tap supply a combination that will give a range of illumination from which a choice can be made suitable for any eyes or purpose.

Heating Confessions.

A recent article in the "Electrician" acknowledges that room and large space heating has been little understood in the electricity industry. This, combined with the fact that so many electrical engineers are finding the heating load is not a particularly good paying proposition owing to the various aspects of its incidence, is rather suggestive of a future sluggish development. The writer of the article proposes the use of electric radiators for the heating of large buildings; and it is described as "a flexible, cheap hot-water system." The theoretical requirements are generaly dealt with; but no example is offered, based on given conditions, to show what are the actual installation and running costs of the system. However, there are in the article confessions that are interesting. It is asserted that much harm has been done to the electrical heating cause in the past by the promulgation of claims for certain electrical equipment which for physical reasons it could not fulfil. We have called attention to the fact frequently, and have by calculation proved the impossibility of the claims being honoured in practical application. This has caused a large amount of discontent; and thus it comes about that the writer of the article in our contemporary is able to say: "Electrical heating has especially suffered from its friends, with the result that, owing to lack of experience, equipment of too small a capacity to produce and maintain a given heating effect has been specified." We agree that a heater should always be well on top of its job. The old definite allowance of one watt per c.ft. of space soon wore itself out by its general inapplicability. Both the heat losses and the heat requirements are not proportional to the volumetric capacity of a room. The heat requirements of a room are twofold: The amount that will be needed to build-up the temperature, and the amount requisite to maintain a given temperature. The factors that have to be considered vary practically in every case; and it calls for an expert to calculate the sum of all losses that occur in any room. We are afraid—in fact, we know—that there is no such refinement observed in ordinary room heating as calculating the heat requirements. It is often left to chance or to simple experiment. If a heater—gas or electric—is somewhat in excess of need, then it can always be regulated to the actual demands for the time being. But in the case of electrical heating, it has become quite a habit to prescribe appliances of inadequate calibre. This has been due to the high cost of electrical energy for heating; but it has been to the disadvantage of the electricity supply industry. It has given the idea that there is no heat in electricity. Of course, there is—if sufficient of it is used; but a sufficiency for heating purposes costs money.

Small Kitchens and Cooking.

The advice is given by the writer of "Cooking and Heating Notes" in the "Electrical Times" to electricity undertakings that they should circularize the tenants of small houses, and show them how by electrical means the discomfort of their small kitchens can be overcome in hot weather. If they do this, we hope they will also say how the discomfort of the account for doing electrically what gas does more cheaply can also be overcome. Some builders are making a feature now—where there are gas-fires in bedrooms, and gas cookers and hot-water apparatus in the kitchens—of the "labour-saving" attributes of the houses. Our friend is sympathetic with those who use gas-cookers in these small kitchens on a hot day; and he says that "thousands of housewives must have had that experience in the last week with its spell of midsummer weather." He should have said "millions"—not "thousands." However, what about the succeeding cold weather, and those long dreary winter months that are experienced now? We know of some workmen's dwellings in which gas was not at first provided, but the tenants of which were so clamorous for it that gas-cookers had to be installed; and those houses have small kitchens. It is really interesting to observe the lengths to which advice is carried in this matter of getting custom for electric cooking. The writer suggests that "the salesman should have a light portable demonstration cooking equipment available; and at the first interview permission should be sought actually to cook a meal for the housewife in her own kitchen. This, of course, would only be feasible provided the house be already wired for lighting; and some arrangements would have to be come to with the supply authority with regard to temporary connection to the mains—for instance, at the consumer's main switch or fuses." The demonstrator is asked to remember that his practical demonstrations should be given in really hot weather, and that he should not forget to point out that doors and windows may be kept wide open; there being nothing to blow out and no products of combustion to pollute the atmosphere. Poor electrical salesman! What a job his is! And now he is asked to expose himself to the ridicule of people who have been using gas-cookers for years.

Explosive Mixtures.

Oldham has been having an experience for which town gas was at one time usually blamed, and for any damage occasioned the local gas undertaking generally meekly paid. During recent months in the borough, there has been a series of underground explosions caused by electrical faults. Respecting the last of these, the Corporation Electrical Engineer states that the mains are insulated with vulcanized bitumen and laid in wooden troughing. When a fault occurs, bitumen gas is generated in the joint boxes and ignited—causing an explosion. The trouble is said to be due principally to the excessive load. In extension work, lead-covered cables are now used.

National Gas Council and Employers' Federation.—The fifth annual general meeting of the National Gas Council will be held in the Pillar Hall of the Cannon Street Hotel, E.C., on Tuesday, June 12, at 3.15. It will be preceded, at 2.15, by the annual meeting of the Federation of Gas Employers.

Scottish Junior Gas Association (Eastern District).—The annual general meeting of the Association is fixed for next Saturday afternoon, at No. 11, Hillside Crescent, London Road, Edinburgh, when Mr. G. H. Gemmell will give an address on "The Chemist in the Gas Industry." Tea and a whist drive will follow. A joint visit to Coatbridge on May 5, with the Western District, has been arranged.

THE BRITISH EMPIRE EXHIBITION 1924.

Representation of the Gas Industry.

A Joint Meeting of the governing Committees of the British Commercial Gas Association, the Gas Companies' Protection Association, the Institution of Gas Engineers, the National Gas Council, and the Society of British Gas Industries, was held on Tuesday of last week to consider the question of the representation of the gas industry at the British Empire Exhibition, to be held at Wembley in 1924.

After discussion, it was resolved that steps should be taken to ensure that the industry is represented in a worthy manner at this Exhibition, in view of the facts that it has "the Empire" officially behind it, is the first big post-war national exhibition, and is being organized on thoroughly "big" lines, with special regard to unity of design and dignity of execution.

Details regarding the form the exhibit should take, and as to whether it should be wholly a co-operative exhibit, or partly co-operative and partly separate exhibits arranged by the gas plant and appliance manufacturers, and as to the total amount of space to be taken, were discussed; but it was felt that decision thereupon would be premature, and could best be dealt with by a representative committee elected for the purpose.

To constitute such a Committee, the following were elected: One nominee of each of the bodies represented at the meeting, *plus* the under-mentioned (who in all cases represent one, and in most cases more than one, of those bodies), and a like number of representatives to be nominated by the Society of British Gas Industries.

Mr. D. Milne Watson	London
,, J. W. Auchterlonie	Cambridge
,, C. Chambers	Harrow
,, G. Clarry	Cardiff
,, J. H. Ellis	Plymouth
Glasgow Corporation Gas Department (Convener of the)	Glasgow
Mr. F. W. Goodenough	London
,, A. A. Johnston	Brentford
Alderman Sir W. Kay	Manchester
,, J H. Lloyd	Birmingham
Mr. J. W M'Lusky	Glasgow
,, J. Patterson	Cheltenham
,, H. Pooley	Leicester
,, W. E. Price	Hampton Court
,, T. P. Ridley	Newcastle
,, W. J. Sandeman	Croydon
,, A. W. Smith	Birmingham
,, J. D. Smith	Belfast
Bailie J. Stewart	Edinburgh
Mr. A. Stokes	London
,, E. Upton	Liverpool
Alderman J. H. Waddington	Halifax
Mr. R. Watson	Doncaster
,, W. N. Westlake	Exeter

The names of the representatives of the "S.B.G.I." will be published as soon as available.

THE INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A Meeting of the Council was held on Monday, April 9, at No. 28, Grosvenor Gardens, Westminster—the President, Mr. James D. Smith, in the chair.

CANDIDATES.

The following candidates were approved for the next ballot list:—For the class of Member: Mr. Claude Diamond, Barrow-in-Furness; Mr. William B. Hetherington, Keswick; Mr. Conrad T. Price, Hampton Wick; Mr. David Robb, Hamilton; Mr. John Robb, Chepstow; Mr. Albert C. Taylor, Royston (Yorks).

For the class of Associate Member: Mr. Lawrence W. Boulter, Commercial Gas Company, London; Mr. Arthur C. S. Corbin, Exeter; Mr. Francis H. G. Highton, Gosport; Mr. George L. G. Payne, Portsmouth; Mr. Garnet T. Temblett, Andover; Mr. William J. R. Waterfield, Brentford.

Mr. James Jamieson, of Edinburgh, and Mr. Harold H. Tysoe, of Maltby, were transferred from the class of Associate Member to that of Member; and Mr. Alfred D. Parkyns, of Exeter, was admitted as a student.

CONJOINT BOARD OF SCIENTIFIC SOCIETIES.

The following resolutions from the Conjoint Board of Scientific Societies, of which the Institution is a constituent member, were communicated: (1) "That the Conjoint Board of Scientific Societies be dissolved." (2) "That the Executive Committee be empowered to wind-up the affairs of the Conjoint Board of Scientific Societies, and to deal with its documents and property."

BRITISH EMPIRE EXHIBITION.

It was announced that a joint meeting of the governing bodies of the National Gas Council, the British Commercial Gas Association, the Gas Companies' Protection Association, the Institution of Gas Engineers, and the Society of British Gas Industries, was to be held on the following day to consider the question of the representation of the gas industry at the British Empire Exhibition, 1924.

NATIONAL GAS EXHIBITION.

Reference was made to the arrangements for the National Gas Exhibition to be held in Birmingham from Sept. 17 to Oct. 3 next. It was decided to hold a meeting of the Council there on Monday, Oct. 1.

DISTRICT MEMBERS.

Officers and Members of the Council for the year 1923 24 were nominated; and it was reported that the following had been appointed to serve as District Members of Council for that period: Mr. Harold Davies, of Chesterfield (Manchester District Institution of Gas Engineers); Mr. P. N. Langford, of Coventry (Midland Association of Gas Engineers and Managers); Mr. Leonard J. Langford, of Tunbridge Wells (Southern Association of Gas Engineers and Managers).

THE BIRMINGHAM MEDAL.

It was resolved unanimously that the Birmingham Medal be awarded to Mr. W. Doig Gibb, O.B.E., M.Inst.C.E., Past-President of the Institution, and that arrangements be made for its presentation accordingly at the forthcoming meeting at Belfast, to be held from June 26 to 29.

GENERAL ARRANGEMENTS FOR THE JUNE MEETING.

Progress of the general arrangements for this meeting was reported. It was stated that at the opening of the proceedings a welcome would be offered by the Rt. Hon. the Lord Mayor of Belfast, Alderman W. G. Turner, who has also kindly extended an invitation to an evening reception in the City Hall. An evening lecture is to be given by Professor Morton, of Queen's University, Belfast.

REPORTS TO BE PRESENTED.

After the President's address, three sections of the work of the Gas Investigation Committee will be reported and discussed. They will deal with the Fairweather recording calorimeter; aeration in atmospheric burners; and the further examination of the blue and carburetted water-gas processes. Other reports to be presented will be those of the Refractory Materials Committee and the Life of Gas Meters Committee. The subject of the Gas Research Fellowship Report this year is "The Gasification of Coke in Steam, with Special Reference to Nitrogen and Sulphur."

PAPERS TO BE READ.

The following papers will be read and discussed: "The Flow of Gas in Pipes," by Mr. Stephen Lacey, of London; "Distribution in Belfast," by Mr. A. M. Cleland, of Belfast; and "Ammonia Yields from Vertical Retorts," by Mr. George Braidwood, of Coatbridge.

VISIT TO THE BELFAST GAS-WORKS.

It is proposed to visit the Belfast Gas-Works, where an opportunity will be given for inspecting the new spiral-guided 7-million holder; and arrangements for visits to shipbuilding and other works are in hand. On the last day of the meeting it is proposed to visit the Giant's Causeway.

ADVISORY COMMITTEE ON THE LIVESEY PROFESSORSHIP.

A report was given of the meeting of the Advisory Committee on the Livesey Professorship of Coal Gas and Fuel Industries at Leeds University, which was held on March 6. The laboratories were inspected, and a visit made to the new coal-testing and gas-manufacturing plant which is being erected at the University as a memorial to the late Sir Corbet Woodall.

EDUCATION COMMITTEE.

The Education Committee reported progress of arrangements made for bringing into operation the scheme which was approved by the Institution at the special meeting in February. The Advisory Committee has been formed, the Board of Examiners nominated, and steps have been taken in conjunction with the Board of Education for the preparation and issue of the requisite preliminary announcements.

A STANDARD METHOD OF OVEN TESTING.

A Sub-Committee of the Gas Investigation Committee has been appointed to consider the question of a standard method of oven testing, which was referred to the Institution by the National Gas Council.

REPORT OF FINANCE COMMITTEE.

The Report of the Finance Committee was presented, accepted, and adopted.

Whitworth Society.—A circular letter, copy of the rules, and subscription form have been posted to every Whitworth Scholar, Exhibitioner, and Prizeman whose present address is known. The preliminary dinner is to take place on Tuesday, Sept. 11, at the Shipping, Engineering, and Machinery Exhibition, Olympia, where the members will be received by the Chairman of the Whitworth Society, Dr. F. S. Hele-Shaw, F.R.S., who is also Chairman of the Committee of Experts of the Exhibition. Anyone eligible for membership, who has not already received the above information, is requested to communicate at once with the Hon. Secretary, Whitworth Society, Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1.

HEATING VALUES AND BURNER ADJUSTMENTS.

It was stated in an article appearing on p. 530 of the "Journal" for Sept. 6 last that reductions in heating value standards from the comparatively high levels previously in force in many American cities, are claimed to have brought about material savings in the cost of manufacture of gas, and lower prices to the consumer, than if the former standards had been continued; but these reductions in standards have not always been brought about without some complaint from the consumers that the service was inferior, and the total cost greater, with a lower heating value gas than with one of higher heating value.

With a view, therefore, of determining the most economic and satisfactory heating value standard for Baltimore, the Public Service Commission of Maryland undertook fully to investigate the matter; and in connection with the inquiry, they asked the Bureau of Standards to carry out laboratory tests for the purpose of determining (1) the relative utilization efficiency of gases of different heating value; (2) the extent to which present appliances can be adapted to give good and efficient service with gases of different heating value and composition; and (3) what adjustment of appliances is necessary to give the consumers good and efficient service when different kinds of gases are mixed, and there is a variation in the composition, heating value, and specific gravity of the gas. The results of the tests are embodied in the Technological Paper No. 222 of the Bureau of Standards, prepared by Messrs. W. M. Berry, I. V. Brumbaugh, J. H. Eiseman, G. F. Moulton, and G. B. Shawn. It is, however, pointed out that, while everything was done to make the tests as practical as possible, it is exceedingly difficult to obtain conditions in the laboratory exactly comparable with those of the average consumer's home.

At present Baltimore is supplied with 500 B.Th.U. gas. A portion of it is coke-oven gas, purchased by the Consolidated Gas, Electric Light, and Power Company from the Bethlehem Steel Company. The remainder of the Consolidated Company's supply is water gas. It was to allow of the economical distribution of the coke-oven gas that the calorific standard for Baltimore was reduced to 500 B.Th.U. In order that a sufficient volume of gas of a constant heating value might be available for a series of tests, a holder having a capacity of 300 c.ft. was secured. Plant was also provided to remove completely from the gas all the tar and every trace of hydrogen sulphide. The Baltimore gas used in the tests consisted approximately of one-third coke-oven gas and two-thirds water gas. Since there were no facilities for its manufacture in Baltimore, coal gas (compressed in cylinders) was obtained from the Philadelphia gas works; the value being about 525 B.Th.U. Water gas of different heating values was made by varying the quantity of oil sprayed into the carburettor.

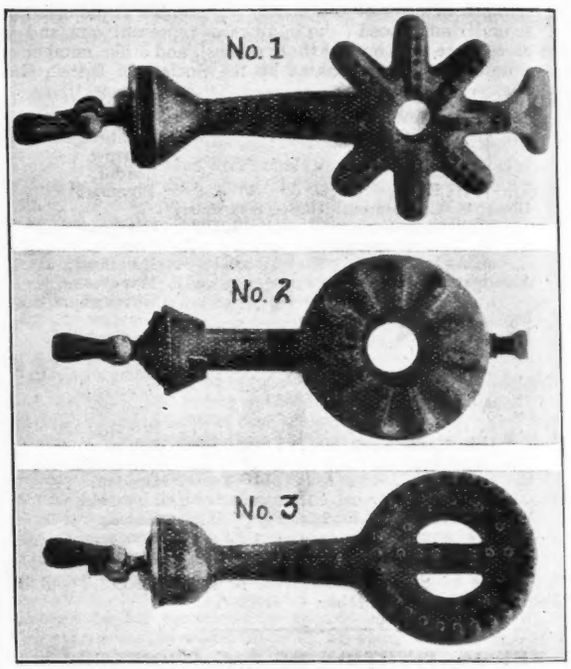
In the tests, three different designs of hotplate burners, about 4 in. in diameter, were used. These are shown here. No. 1 was selected because it is the most extensively used in Baltimore, and represents the "star" type of burner; and No. 2, which is of the "disc" pattern, because it was desired to test a burner of an old design, many of which are still in service in Baltimore. No. 3 was employed only in the study of the effect on efficiency with a change of distance of the utensil from the burner. It is one of the later designs of the "disc" burner, and is much used in New York City. The utensil used was about 8 in. in diameter, with a capacity of 4 quarts.

Two quarts of water (4·17 lbs.) were heated from tap-water temperature to boiling. The difference between the meter readings at the time the utensil was placed over the burner and at the time the water reached 212° Fahr., gave the uncorrected volume in cubic feet of gas consumed. This volume was then corrected to the standard barometric condition of 30 in. mercury pressure at 60° Fahr. The efficiency was calculated on the basis of the quantity of heat absorbed by the water relative to the total quantity of heat contained in the gas consumed. No allowance was made for the heat absorbed by the utensil. The efficiency values given are the averages of two tests at each position. The burners were adjusted in the way that a practical gasfitter would do in a consumer's house. The pressure at which gas is supplied to consumers' appliances in Baltimore averages about 3 in., and the careful initial adjustment of the burners for each kind of gas was made for this pressure. Afterwards, no other changes were made in the gas orifice or air shutter when the burner was operated at other pressures.

Within the range of gas consumption normally used in top-burner cooking, says the report, there will be some variations in the efficiency with the rate of heating. Since this is the case, it appears logical that, for an exact comparison of the efficiencies of gases of different heating values, the burners must be supplied with the same total quantity of heat units per hour. From observations made by the Bureau during investigations in a large number of cities, and from laboratory tests carried out by them, it has been observed that a good average adjustment on a regular burner will represent a consumption of about 9000 B.Th.U. per hour. An adjustment for this rate will allow a variation in gas pressure which will be within the usual legal requirements without causing poor service or loss in efficiency. For example, a burner adjusted to 9000 B.Th.U. at 3 in. pressure will consume 7000 B.Th.U. at 1·8 in., and will not exceed 11,000 B.Th.U. at 4·4 in. pressure.

The efficiency values obtained with the varied heating-power gases, the corresponding rates of consumption, and the time required to heat 2 quarts of water to boiling point from 80° Fahr., are set forth in tables. The tests proved conclusively that when the regular burner No. 1 (4¼ in. in diameter, with 48 ports, No. 40 drill), placed 1⅜ in. from the utensil, consumed gas at the rate of 9000 B.Th.U. per hour, all the different gases, irrespective of the kind of gas or B.Th.U. content per cubic foot, gave a constant efficiency of about 37 p.ct., within the range of heating values used in the tests (300 to 600 B.Th.U.). The time required was about 10 minutes. At a rate of 7000 B.Th.U. per hour, an average efficiency of some 36 p.ct. was obtained; and the time taken was 13 minutes. For a rate of 11,000 B.Th.U. per hour, the average efficiency was about 37·7 p.ct., and the time required 8 minutes. These results, it is remarked, show that the efficiency of heat absorption varies only slightly with a change in the rate of heat supply. It follows, therefore, that the rate of heating varies almost directly with the rate of supply of heat.

Taking No. 2 burner (3⅝ in. in diameter, with 44 ports, No. 40 drill), also 1⅜ in. from the bottom of the utensil, the efficiencies obtained with the gases of different heating values were very similar to those with No. 1. Corresponding tables show that with gases of various heating powers, and a consumption of 9000 B.Th.U. per hour, there was an average efficiency of about 37·8 p.ct.; and the time needed to heat 2 quarts of water to boiling from 80° Fahr. was 9·7 minutes.



In these tests it was impossible to control the room temperature; but in making a study of the efficiency results and the room temperature at the time of the tests, it was impossible to find any indication that the variation in temperature affected the results. The adjustment of burner No. 1 to consume gases of different heating values warrants the conclusion that the burner can be used without alteration to give good service with water gas of a calorific value as low as 350 B.Th.U.; but on account of the loose-fitting air shutter and mixer of burner No. 2, this could not be utilized with water gas of a heating value lower than about 450 B.Th.U., and a pressure of 3 in., without devising some means to obstruct the flow of primary air into the burner.

As to the effect of a change of specific gravity of mixed gases, the reporters say that, provided satisfactory and uniform pressure conditions can be maintained, it should be possible, by a correct adjustment, to secure reasonably good service with most domestic appliances even with considerable variation in the specific gravity of the gas. If the supply is composed mostly of the heavier gas at the time the burner adjustments are made, the best average adjustment is obtained if the burners are adjusted for a gas rate slightly below the normal rate, and the air shutters are set so that the flame is a little harder than a normal flame. If, on the other hand, the gas supply is composed mostly of the lighter gas at the time the burner adjustments are made, the best average adjustment is obtained by regulating the gas rate to slightly above a normal rate, and by setting the air shutter position to produce flames a little softer than a normal flame. When the heating value per cubic foot of gas and air mixture is 250 B.Th.U., the flame is very soft; while for 150 B.Th.U. the flame is very hard.

Tests were made to ascertain the efficiency with change of distance of the utensil from the burner; and curves show the decrease in efficiency as this distance is increased. Curves for

600 B.Th.U. C.W.G. are almost identical with those obtained when using 500 B.Th.U. C.W.G., which, it is remarked, shows that the heating value of the gas makes no difference in the efficiency of a burner, provided that the comparison is made when the B.Th.U. per cubic foot of mixture is constant. The position of the burner relative to the utensil has a marked effect on the efficiency. By moving the utensil from a ¾ in. to a 1½ in. position, a decrease in efficiency is caused amounting to about 15 p.ct., irrespective of the gas rate. The efficiency tends to increase with the amount of flame contact, until the flame begins to extend up the side of the utensil. When, however, the utensil is placed so close to a burner that there is cone contact, carbon monoxide is produced; and it is desirable to place the utensil at a distance from the burner that will give the highest obtainable efficiency without the formation of carbon monoxide. The efficiencies obtained with burner No. 3 on 500 and 600 B.Th.U. C.W.G. were consistently higher than those for similar adjustments with No. 1. This is due in a large measure to the tendency of the flame to incline towards the centre, and thus give a concentration of heat at this point. This type of burner is such that there is insufficient aëration of the flame, which results in an increase in the flame volume, and therefore better flame contact. The tests showed that, for the size of vessel used, the minimum distance should be about 1 in. for burner No. 1; while for burner No. 3 the vessel should not be placed closer than about 1¼ in.

With burners properly located and adjusted, the danger from carbon monoxide is remote with normal rates of consumption. Analyses indicated that, with the ranges used, the burners of which were 1⅜ in. from the vessel, practically no carbon monoxide was produced with any of the gases tested, unless gas was burned at a rate greater than about 12,000 B.Th.U. per hour. The disc type of burner produced more carbon monoxide than the star type, when operated at the same distance (1⅜ in.) from the utensil, and at the same rate of consumption. The heating value or the kind of gas did not seem to be factors affecting the production of carbon monoxide.

Many cooking processes require the heating of the water in the utensil up to boiling, and the maintenance of the boiling temperature thereafter until the food is completely cooked. Some people forget, or do not know, that water cannot be heated to a temperature higher than 212° Fahr. at atmospheric pressure, and that violent boiling does not accelerate the speed of cooking. It only evaporates water needlessly, wastes gas, and causes the consumer to complain of high bills. From a series of evaporation tests, with gas of 502 B.Th.U., and a rate varying from 2·05 to 18·5 c.ft. per hour, the following conclusions are drawn:

1.—With a lid on the utensil, violent boiling (gas on full) consumes about nine times more gas than is necessary to maintain gentle boiling.
2.—For gentle boiling, about five times as much gas is used with the lid off as would be required if a lid were on the utensil.
3.—When violently boiled, the water evaporates at about the same rate with the lid on as with the lid off.
4.—Gentle boiling evaporates water about six times as fast with the lid off as compared with the lid on.

Appliances require less pressure to give good combustion with lower heating value gases. Tests of burner No. 1 show that with 500 B.Th.U. C.W.G. a pressure of 1 in. is enough to give the required primary air for good adjustment; and with 600 B.Th.U C.W.G., a pressure of about 1½ in. is sufficient. Burner No. 2. could be adjusted to 450 B.Th.U. gas with a 3 in. pressure without any changes in the appliance; and burner No. 1 could be similarly adjusted to 350 B.Th.U. gas. The results, on the whole, indicate that present domestic range burners can be adjusted to give satisfactory service over a wide range of heating value; the slight differences in behaviour of the various gases not being of sufficient importance to have much weight in any consideration of their relative merits for use in domestic appliances. It is quite practicable, therefore, for appliance fitters to adjust domestic range burners so that the service will be good and there will be no appreciable loss in efficiency, even though the heating value, the specific gravity, and the pressure vary over considerable limits. Certain types of gas lamps and industrial appliances which demand a rather constant B.Th.U. rate per hour would not, however, operate as well under these conditions. In general, the less variation there is in heating value, composition, specific gravity, and gas pressure, the easier it is to adjust the appliances to the most ideal condition, and the more satisfactory will be the service.

Eastern Counties Gas Managers' Association.—A busy and enjoyable day is in prospect for members of the Association next Wednesday, on the occasion of their visit to Southend-on-Sea. The morning is to be devoted to an inspection of the works of the Gas Company, of which the President of the Association (Mr. T. F. Canning) is Engineer and Manager. Luncheon at the Palace Hotel, as the guests of the Chairman and Directors of the Company, will be followed by the business meeting at 2.45. At this the President will deliver his address, and Mr. P. D. Walmsley, of Great Yarmouth, will read a paper entitled "Reconstruction at Yarmouth." In the evening there is to be the annual dinner, also at the Palace Hotel; and for the following morning it is proposed to arrange a drive (weather permitting) in the neighbourhood of Southend.

EFFICIENT BENZOLE RECOVERY.

In a paper recently read by Mr. J. D. Morris before the Midland Section of the Coke Oven Managers' Association, it is emphasized that unless some serious loss in the production of benzole occurs, the plant is merely kept up to what is called "normal" working. So long as a given amount of oil is passing through, and the oil is not too thick, the recovery of benzole is thought necessarily to follow, any small losses being often attributed to differences in the coal carbonized. This is no doubt true to a certain extent, but any losses which occur should be able to be detected immediately.

If a constant high efficiency is desired, five points in the recovery of benzole should receive careful and regular attention. In the first place, the temperature of the gas entering the recovery plant should be low; and secondly the temperature of the oil fed should be low consistent with the viscosity. These temperatures should be controlled and registered by a recording thermograph. The quality of the oil is also important. After the most suitable oil for the particular washing apparatus has been determined, the oil should be tested regularly as follows: Specific gravity, water, distillation test, and naphthalene. A graph may be plotted of the new oil distillation, and graphs of subsequent distillations compared with it. A further graph of the oil when too thick for use will enable the gradual thickening of the oil to be traced and remedied in good time. A careful watch must be kept on the benzole still, so that the oil is thoroughly stripped of benzole before being returned to the recovery plant. A meter should be installed, so that regular checks can be made of the oil passing into the washing plant. From 80 to 100 gallons of fresh debenzolized oil per hour per ton of coal carbonized fed to the recovery plant is usually sufficient for good recovery.

The fourth point is the regular inspection of the washing apparatus. All sprays, grids, brushes, &c., should be periodically inspected. Finally, regular tests should be carried out on the quality of the oil and the amount of benzole recovered by each individual set of plant, the gas leaving the recovery plant being tested at least daily for the benzole content.

There are different methods of testing the oil. Water, distillation test, and naphthalene estimation tests are fairly uniform. The benzole content of the oil does not as yet appear to be determined with accuracy, and the following method has given good results: 500 c.c. of the oil is distilled in a side-arm flask until 100 c.c. of distillate has distilled over. After eliminating all water, the distillate is then placed in a 150-c.c. round-bottomed flask fitted with a four-bulb pear still-head, with the thermometer in the vapour. The distillation is carried on, and readings taken every 10 degrees, from 90° C. up to 150° C. By comparing the varying percentages for each ten degrees, the progress of saturation or extent of stripping of the oil is indicated, and can be controlled. The viscosity of the oil is usually only tested on rare occasions; but with centrifugal scrubbers this test will become necessary.

The testing of the gas is really the most important, and there are many interesting methods for arriving at the benzole content of the gas, most of which depend upon the absorption of the benzole by oils or other absorbents, with subsequent distillation. The best method of testing the gas the author has tried is by making use of the method of M. St. Claire Deville, with slight alterations. As is known, he makes use of carbonic acid snow in order to condense the benzole from the gas. The method adopted is similar to that described in his paper, except that two tubes are employed, and thermos flasks are used to contain the snow instead of Dewar flasks. The carbonic acid snow is obtained by placing a linen bag over the outlet from a cylinder of liquid carbonic acid. The valve on the cylinder is slightly opened, and snow condenses in the bag. Two drying towers are filled with calcium chloride in order to dry the gas before passing into the tubes. A meter is placed after the test for measurement of gas passed, the rate being found to be most reliable at 3 to 4 c.ft. per hour for stripped gas, and slower for rich gas.

There are no doubt small errors in the process, but on the whole it is far in advance of any method involving absorption and distillation. The test is not expensive, and by it any error in the working can be detected within three hours instead of the usual twenty-four. The errors are not such as to influence the results unduly.

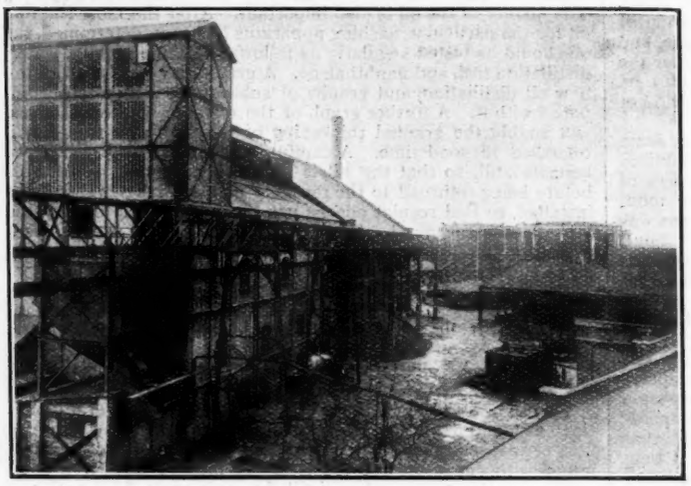
British Cast-Iron Research Association.—In their March circular, the Association report progress of researches in hand, and say that during the past month the membership has very materially increased. The office is at Central House, New Street, Birmingham.

Midland Junior Gas Association.—The annual general business meeting of the Association will be held on Thursday, the 26th inst., in the Council House, Birmingham, and will be followed by a discussion between Mr. L. H. Thomas (Senior Vice President) and Mr. R. G. Marsh (Past-President). Mr. Thomas will state "What Manufacture Expects from Distribution," and Mr. Marsh "What Distribution Expects from Manufacture." The Directors of the Redditch Gas Company, through Mr. C. F. W. Rendle (the President), invite the Association to inspect the Redditch Gas-Works on Saturday, May 26.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Works of the Lea Bridge District Gas Company.

Much gratification was felt on all hands at the excellent turn-out of members of the Association last Saturday afternoon for the visit to the works of the Lea Bridge District Gas Company. This was a well-deserved compliment to the President (Mr. D. Cleave Cross, Assoc.M.Inst.C.E.), who is Assistant Engineer of the works, of which his father (Mr. F. W. Cross, M.Inst.C.E.) is Engineer and Manager, and to those who were at much pains to make the visit a success. There must have been present more than 130 members and visitors—the latter including Mr. Samuel Cutler, jun., Mr. Ernest Cutler, and Mr. A. Gardham (Directors of Messrs. Samuel Cutler and Sons, Ltd.), and Mr. C. Chambers, of Harrow. Mr. Richard Sandell, the veteran Secretary of the Company. was also present.



Front view of Retort Houses.

Upon arrival, a prompt start was made with the inspection of the works, under the guidance of Messrs. F. W. Cross, D. C. Cross, D. J. Winslow, W. T. Kenshole, W. H. Noble, J. Harford, and F. Taylor, who added many details to the information contained in an illustrated booklet which had been prepared for the occasion. Besides this, each piece of plant had attached to it a clearly written card briefly explaining its duty—another sign of forethought on the part of the hosts. Everywhere orderliness and cleanliness was a feature that strongly impressed itself. A number of those present had visited the works before; and they were able to appreciate to the full the important extensions that have taken place on the works of recent years. For further additions that may be in contemplation, there is now ample space available.

Some Details of the Works.

The Lea Bridge District Gas Company was formed in 1868, when the works were purchased from the County and General Gas Consumers' Company. The first Chairman was Mr. J. Birch Paddon, who retained this position until his retirement in 1900. His son, Mr. A. M. Paddon, is now Chairman. The present Engineer and General Manager, Mr. F. W. Cross, has been with the Company since 1895; while Mr. Richard Sandell (who was appointed Secretary in 1882), has been connected with the Company since its formation. The undertaking serves a large district, comprising Walthamstow, Highams Park, and part of Leyton; there being 106¼ miles of mains. Whereas in 1873 the make of gas was 21 million c.ft., the output in 1922 was no less than 801 millions. The area of the works is nearly 15 acres, and includes 4½ acres recently purchasd, on which a new holder and tank of 2½ million c.ft. capacity are now in course of construction.

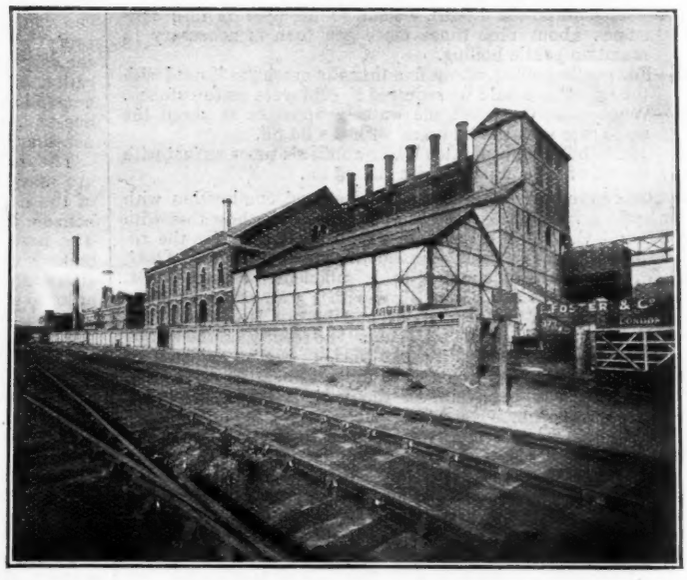
Most of the coal used is from Yorkshire, and is received by rail. The wagons are placed on a private siding at the back of the retort-houses, and discharged into a hopper by a hydraulic tipping ram; the coal then being taken by bucket elevators to the vertical retort-house hoppers or into store. In the inclined retort-house, the coal is elevated from the stores to hoppers by means of a hydraulic lift, which has been in continuous operation since 1899.

The inclined retort-house, which has a capacity of 1 million c.ft. a day, was erected in 1899, and contains eight settings of eight retorts each, set at an angle of 32°, and 20 ft. long. They taper from 18 in. by 15 in. at the top, to 24 in. by 15 in. at the bottom. There is a separate hydraulic main to each setting, with an adjustable liquor seal-pot to each; and the gas passes away through two retort-house governors. All the furnaces are being fitted with the "Sydenham" grate.

The vertical retort-house, of a capacity of 1¾ million c.ft. a day, was erected by West's Gas Improvement Company, Ltd., in 1914. Four settings, with eight retorts in each, were built then; and two further settings were placed in the same house in 1920. The retorts are 21 ft. long and 3 ft. 3 in. by 18½ in. at the bottom, tapering evenly to 2 ft. 9 in. by 10 in. at the top. The throughput per day for the six beds is about 120 tons, or 2½ tons per retort. Each setting has a separate furnace, and is so arranged that one-half (four retorts) can be worked alone as a unit. The furnaces are of the usual step-grate type, with open doors; the control being regulated by the chimney and producer dampers. The coke-extractor gear is operated by wire ropes; the power being obtained from two 10-H.P. "National" gas-engines worked in duplicate. The retorts are steamed to give a quality of nearly 500 B.Th.U., and a make per ton of about 14,500 c.ft. They are scurfed every 45 days. The coke used to fill the retort after scurfing, and for the producers, is raised to overhead hoppers in bogies by an electric lift. The coke extracted is discharged from the retorts every 1½ hours into telpher skips, and run out to the front of the house on to turntables under the telpher conveyor.

The electric mono-rail telpher runs practically the length of the works, and conveys the whole of the coke in bottom-opening skips from the vertical house to either the coke yard or the water-gas plant. It was built by Messrs. Strachan & Henshaw, Ltd. The total length is 733 ft., and the height of rail above ground 32 ft.; the longest span between trestles being 61 ft. Each machine has a lifting capacity of 45 cwt., and a travelling speed of 8 miles an hour.

The coal gas before passing to the exhausters is condensed in two 1 million c.ft. Clapham "Eclipse" reversible water-cooled tubular condensers. There are two twin sets of four-blade exhausters driven by steam-engines, of Messrs. Waller's design. The three Lancashire boilers are of the Thompson dish-ended type, fitted with Wilton's forced-draught furnaces. Two dynamos are driven by Sisson's high-speed steam-engines running at 500 R.P.M., which have given excellent service. The electricity generated



Back view of Retort Houses.

is used for driving the coal plant, the vertical retort-house lift, the telpher, and the pan-breeze plant. The gas, after leaving the exhausters, passes through two Livesey washers, a Pelouze and Audouin tar extractor, and two Holmes horizontal rotary washer-scrubbers worked in parallel. Fresh water is admitted to the rotary washer-scrubbers, and after passing through the rotary and Livesey washers is raised to about 16 oz. strength liquor.

The purifiers are in one block of four, 30 ft. square by 6 ft. deep, with one 30 ft. by 15 ft. by 6 ft. check purifier. The covers are jointed with rubber, and held down by Milbourne fasteners. The valves are of the Milbourne duplex-valve type, with a trinity valve on the catch-box. The purifiers are fitted with one tier of "Simplex" and four tiers of "Climax" grids, the actual depth of purifying material being 4 ft. 6 in. The gas enters at the top of each purifier, and leaves at the bottom; and they are worked in the backward rotation—the oxide being worked up to about 54 p.ct. sulphur. In the older set of coal-gas purifiers, which are

not in use at the present time, there are four boxes 25 ft. by 20 ft. by 6 ft., and a check box of 20 ft. by 12 ft. by 6 ft. These have a water-lute seal of only 27 in. They are connected direct with an old 30,000 c.ft. per hour meter in the governor-house. The gas in these purifiers has an upward flow. With the inclined house, these old purifiers and the meter are the only apparatus of the old coal-gas section working in 1914 now left on the works. The coal-gas station meter, to pass 80,000 c.ft. per hour, was erected by the Gas Meter Company in 1914. In the house with it is a battery of valves controlling the gas to and from the different holders.

The water-gas plant was erected by Messrs. Humphreys and Glasgow, and has only recently been completely reconstructed. There are three sets, of 1, 1½, and 1¾ million c.ft. per day. The two larger sets are coupled with a waste heat boiler which has been at work since last Christmas. With the ample reserve of blowing power, it has been found possible to make with the waste-heat boiler alone the whole of the steam required for the generator, blower, and two pumps. The normal practice is to work the waste-heat boiler coupled with a Lancashire boiler which is supplying steam for the hydraulic and air compressor engines. There are two 75 H.P. De Laval turbines driving Sturtevant blowers, and two 55 H P. turbines driving Schiele fans. The water-softening plant erected specially for the waste-heat boiler is of the Lassen Hjort patent automatic type. The water is received from the condensers at about 140° Fahr., and containing about 17° to 22° of hardness, and is then reduced to 1° to 2° hardness by a prepared "Sofnal" mixture of lime and soda ash. From the relief holder the gas is exhausted by either of two Waller four-blade machines, with belt drive from two Crossley gas-engines. The water gas passes through a Livesey

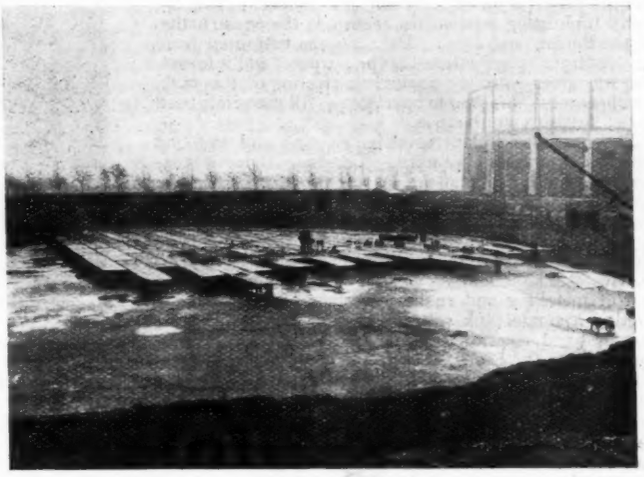
Tank Bottom and First Row of Sides on Packings Ready for Testing.

washer, extracting light oils, and thence to four purifiers constructed with Walker's rubber joint and Milbourne's patent fasteners. The purifiers are fitted with "Climax" and "Simplex" grids, and contain 4 ft. 6 in. depth of oxide. The water gas is registered by two 80,000 c.ft. Thorp rotary meters. The first was installed in 1911, and has worked very satisfactorily. The water gas is mixed with the coal gas at the inlet of the holders.

Arrol hydraulic engines in duplicate, working at 600 lbs. per sq. in. pressure, and a 20-ton hydraulic accumulator, have been in use for 23 years. The hydraulic power is utilized for the carburetted water-gas coke hoist, the inclined retort-house, coal lift, and coal wagon ram and capstan. Two Arnold Goodwin "Beatall" steam-driven vertical air compressors pump the whole of the water supply for the works from a well 220 ft. deep, by means of air lift. The air pressure required is 80 lbs. per sq. in.; and the average throw of the compressors 5000 gallons per hour.

The gas is delivered to the district through three water-loaded governors feeding 24 in., 18 in., and 12 in. mains. There are two single-stage Rateau type fans, driven by steam-turbines, for increasing the pressure of the gas between the outlet of the holders and the inlet of the governors. These are worked every midday and evening. The capacity of each is 200,000 c.ft. per hour at 2230 revolutions, against a pressure difference of 8 in. The plant was installed in 1910. In 1921 a new feeder main (20 in. to 16 in.) was laid from the works for a distance of 3½ miles. This feeds the outer portions of the district, and returns to meet the supply from the governors. The main is of cast-iron; and during the hours of heavy demand or low holder pressure the gas is boosted through it by a three-stage Rateau turbo-booster by Messrs. Bryan and Donkin. Its capacity is 200,000 c.ft. per hour at 4200 revolutions against 62 in. pressure. The turbine has 51 H.P. and is of the Brotherhood type. The maximum pressure required at present is only 12 in.

The main tar and liquor storage is in an old cast-iron gasholder

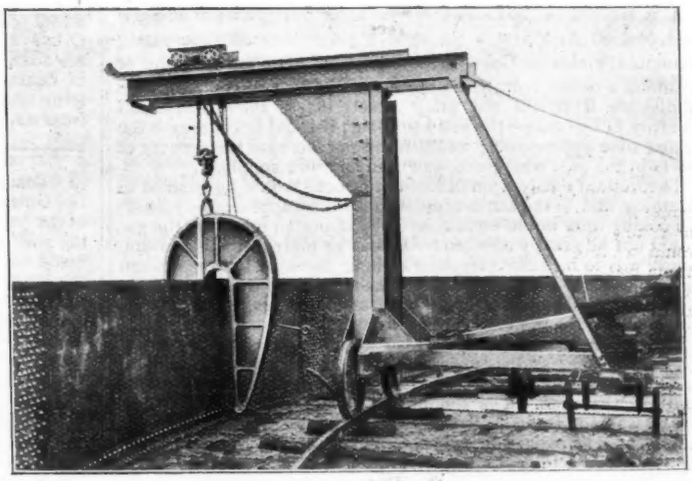


Laying of Tank Bottom.

tank situated in the centre of the works. It has a storage capacity of 232,000 gallons. Overhead tar and liquor tanks at the side of the exhauster house will hold 10,600 gallons. These tanks are used for circulating weak liquor through the Livesey washers, and for collecting all the day's make of tar and liquor from the syphons. A vertical retort-house circulating liquor tank standing in front of the retort-house holds 15,000 gallons. Two pumps are continually circulating this liquor through the vertical retort collecting mains and the retort-house governors, to prevent deposit of ammonium chloride.

The sulphate plant is of the Wilton closed saturator type, designed to make 3 tons of sulphate per day. There is an overhead liquor tank on the building which will hold 13,000 gallons; and the liquor passes by gravity through a glass sight-feed to the still. The acid is also stored in two 10-ton tanks on the roof. The acid is emptied into an old boiler tank, and driven-up to the overhead tanks by compressed air. Difficulties have been experienced in getting rid of the effluent liquor; and experiments are now being made with the "Hornsey" method of decolorizing the liquor by forcing boiler-flue gases up two cast-iron towers filled with wood grids, down which the hot effluent liquor passes.

A newly installed "Columbus" coke separator received considerable attention at the hands of the visitors.



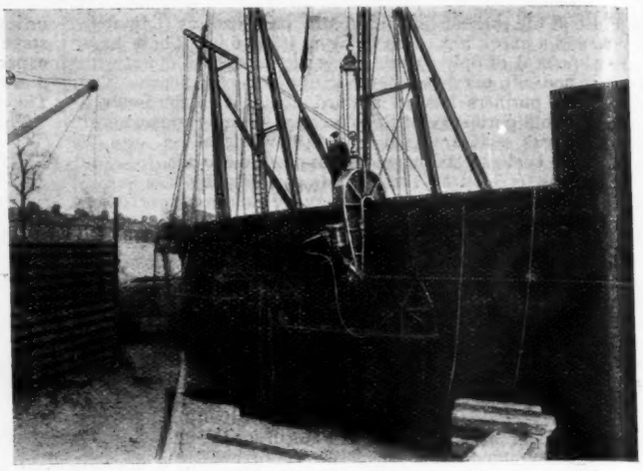
Pneumatic Riveting Bottom Curb.

A New Two-and-a-Half Million Holder.

The inspection was particularly well timed, inasmuch as an opportunity was thereby afforded of viewing a new 2½ million c.ft. four-lift spiral-guided holder, in steel tank, which is in course of erection by Messrs. Samuel Cutler and Sons, Ltd. The total storage

capacity of the works at present is 1,130,000 c.ft., whereas the maximum 24 hours' output for the past three years has been just over 3 million c.ft. The capacity therefore is only 36 p.ct. of the maximum day's output. Hence the need for the new holder. The contractors had been good enough to make special arrangements for the visit, in the form of a demonstration of their plant at work, and the preparation of an illustrated booklet containing many interesting particulars regarding the construction of the holder and tank. Details were extracted from the contract specification for the purpose, and information was given as to the pneumatic riveting of the tank, which process was seen in operation. All materials used are of British manufacture.

The pneumatic plant used for riveting and caulking the tank comprises a 42 B H.P. oil-engine driving a compressor which delivers air up to 100 lbs. per sq. in. pressure to the receiver and distributing hoses. The riveting machines have a 6 ft. gap, and an arrangement of pistons and toggles by means of which a steady closing pressure of up to 100 tons can be brought to bear upon the rivet. The machines weigh over 2 tons each. The cost of installing and running a plant of this kind for riveting a single tank will, it was said, often exceed the cost of hand riveting; but power-riveted work is unquestionably the best.



Tank Bottom Lowered after Testing. Erection of Sides in Progress.

Photographs are reproduced showing successive stages in the erection of the tank. The bottom and first row of side plates were erected upon timber stools (termed horse boxes), of sufficient height to allow access between the underside of the tank and the foundation. After completion of the riveting and caulking of this portion of the tank, it was flooded with water, and all seams and rivets carefully examined, after which it was lowered by a series of jacks on to the permanent foundation. The remainder of the side plates were then erected and riveted in successive tiers. The lifts will be built in succession from the floor of the tank, working inwards from the outer to the inner lift.

The foundation consists of a bed of cement concrete varying in depth from 1 ft. 9 in. at the centre to 3 ft. at the outer ring. The top of the foundation is 6 ft. below ground-level, and the subsoil below the concrete is good sharp ballast.

Acknowledgments.

The inspection concluded, the party sat down to tea, after which,

Mr. Samuel Cutler, jun., proposed "The London and Southern District Junior Gas Association." He congratulated the President on being at the head of a very live society. In his younger days, he said, he took a very keen interest in junior association work, and perhaps he might remind them of the parent body of this character—the Junior Institution of Engineers, which had been a very successful organization, and had included a number of good men. In their own Association, they were following on exactly the same lines. His firm esteemed themselves fortunate in being able to show the members a holder in course of construction. It did not fall to the lot of engineers to put up many holders in their time; and therefore to see one under construction must prove very interesting. He firmly believed that to employ the very best methods of erection and tools for the purpose paid well in the long run; and upon this principle his firm acted

The President, in reply, expressed the indebtedness of the Association to Messrs. Cutler for all they had done that afternoon. The firm had even, at some cost to themselves, altered their programme somewhat so as to get things into as interesting a stage as possible for the time of the visit. They had kept men at work solely for the benefit of the members, and had provided various facilities to ensure the success of the inspection. He was much pleased at the "bumper" attendance that afternoon.

Mr. W. Grogono, proposing a hearty vote of thanks to the Directors of the Company, Mr. F. W. Cross, Mr. D. C. Cross, the various guides, and Messrs. Cutler, for all that had been done for them, referred to the "Columbus" coke separator. He had seen one of these machines at work on the previous day, and the results were simply marvellous; the separation being perfect. He had never seen a cleaner works than those at Lea Bridge.

Mr. F. A. Frost, who seconded, remarked that the expectations of the members had been fully realized, and during the visit they had secured a lot of useful information. One could not fail to be impressed by the fact that those in charge at Lea Bridge were very much alive to the need for cheap production. The President richly deserved the compliment implied by the large attendance.

Mr. F. W. Cross acknowledged the vote. He told them he was present not only in his capacity as Engineer of the works, but also as the representative of his Board. The Chairman (Mr. A. M. Paddon) had said: "I am sorry I cannot come down; but give my hearty good wishes to the members, and give them a good time." He hoped they had had a good time, both round the works and round the tea-table. [Applause.] It was a great pleasure to him to see so many present. Of course, these visits were not arranged without a great deal of labour; and his son (who had organized the arrangements) and everyone else on the works had done their share. He wished personally to thank Messrs. Cutler, his son, and the members of his staff for all they had done. Should any of those present desire to see the new holder again at a further stage before completion, it would only be necessary to express the wish, and a cordial welcome would be extended.

STEAMING IN COKE-OVENS.

At a Meeting of the Coke-Oven Managers' Association at Sheffield, Mr. R. A. Mott, M.Sc., read a paper entitled "Increasing Ammonia Yields in Coke-Oven Practice." On the question of steaming a coke-oven, the author remarked that it would only be admissible if it did not affect deleteriously the quality and quantity of the coke—the main product; if it did not increase the coking time appreciably; and if it did not increase the amount of inerts in the gas, where this was used for town supply.

Theoretically only a small amount of coke would be gasified in steaming, and so the ash content would not be appreciably raised; the coking time would be increased by about 40 minutes; the gas would not be greatly affected; whereas an increased yield of ammonia was to be looked for, and a slight increase in the amount of gas. More liquor would be made, which would result in greater work being thrown on the condensing plant, though this would only be to the extent of 6 to 12 p.ct.

The steaming process demanded a good mixing of the steam with the gases; and steam would therefore have to be admitted at as many points as possible, discharging into the centre of the width of the oven. The amount of steam which would be required was not great, so that with, say, sixteen nozzles along the length of one oven, the orifices would have to be about one-sixteenth of an inch in diameter. A real difficulty would be to keep these small nipples from being blocked-up by the charge before they were used. Some device must be employed to keep the coal away from the nozzles. This could be done by means of a perforated plate or the side bricks of the oven. The nozzles would then be below the sole-level, and the peel of the coke-box would slide along freely. Coke and slack would fall round and on the nozzles during charging and discharging, and probably the perforations and nozzles would become carboned up during the carbonizing period. Further difficulty lay in the choice of substance with which to make the nozzles.

The process would be more easily adapted to an Otto regenerative oven, where there were cellars underneath the oven, than in a Koppers' type which had its regenerator underneath. The steam pipe might be made somewhat like the burner pipe in the Otto system. The nozzle would thus be exposed to only moderate heat, and could be removed for inspection, &c. There was, of course, a supporting arch underneath alternate ovens in the Otto system; but at least every other oven was approachable from underneath.

Condenser Investigations.—There has been commenced at the United States Bureau of Mines Experimental Station a study of the performance of various types of condensers used for cooling and detarring carburetted water gas. Arrangements were made for testing two condensers, one of the water-tube type and the other of the gas-tube type. It is desired to learn the rate of heat transfer and amount of cooling water required at various temperature differences between gas and water. After testing surface condensers, it is proposed to test those of the contact type.

A Detector for Water Vapour in Closed Pipes.—A simple device is described, in a paper submitted by Messrs. E. R. Weaver and P. G. Ledig to the American Chemical Society, for determining the approximate concentration of water vapour in a gas. A glass tube is coated with platinum, and the coating divided by etching into two electrodes; and platinum wires sealed through the glass connect the electrodes to a measuring circuit. The resistance to alternating current of a thin film of a hygroscopic electrolyte bridging the gap between the electrodes, is used as the measure of the water vapour in the atmosphere with which the film is in contact. Sulphuric and phosphoric acids and various hygroscopic salts can be used in forming the conducting film. The detector is simple, and easily adapted for use in high-pressure piping and other situations in which the determination of water vapour is usually attended with difficulty.

NEW SOUTH WALES AND QUEENSLAND GAS INSTITUTE.

Presidential Address of Mr. H. Tindale.

At the last Annual Meeting of the above Institute, Mr. H. Tindale, of the Australian Gas Light Company, delivered his Presidential Address, from which we give the following extracts.

Carbonization.

Although thousands of miles separate us from the Old Country, thanks to the technical journals, we are able to keep in moderately close touch with the latest developments which have taken place there. The adoption of scientific and economic methods, and of plant designed to give the maximum efficiency, is becoming universal in our industry to-day. During recent years the scientific side of carbonization has received very special attention. Mention of carbonization draws our thoughts to the continuous vertical-retort system which, more than any other scheme, has contributed to the progress of the industry. This system is more suitable than any other for a climate such as ours. Nearly ten years' experience under local conditions has now been gained; and the results have proved that the continuous vertical retort has definitely established its superiority, particularly in low operating, repair, and maintenance charges. It is interesting to note that all the better-known carbonizing systems have been, or are, in use in Australia; and our own State has the distinction of being the first to enter the complete gasification stage—a plant having been erected at Bathurst. This plant, invented and designed by Mr. Wood, is an entirely Australian production. In connection with carbonization one must deplore the fact that our Gas Act does not permit us to take full advantages of recent developments. It is hoped that some day this Act will be amended so as to enable each gas undertaking in New South Wales to determine for itself the system of manufacture and distribution, and the quality of gas calculated to give the best service at the lowest cost.

Purification.

While the best efforts, ingenuity, and skill of engineers and chemists have resulted in notable improvements in carbonizing systems during the last ten years, little progress can, unfortunately, be recorded in the methods of purifying gas; the term "purifying" being used in its widest sense, as including condensing, washing, and scrubbing. I propose to criticize the present methods, and to note several defects, possibly well known to you, because I desire to focus your attention on the fact that the problem of purification is far from being solved. I regret that at this juncture I cannot suggest better methods; but I may state that, thanks to the instigation and encouragement of my chief, Mr. Andrew Wilson, the subject generally is under investigation by the staff of the Australian Gas Light Company, and much valuable data have been collected, which may later prove to be the foundation of a substantial improvement in existing practice.

Gas Condensers.

One of the greatest handicaps in condensing gas is the fact that such good heat conductors as brass or copper cannot be used owing to the action of ammonia on these metals. Hence, wrought iron or cast iron has to be substituted. Both these metals unfortunately possess a much lower coefficient of heat conductivity, that of cast iron being less than that of wrought iron. An additional handicap is that tubes cannot be kept absolutely clean owing to the adhesion of tar or liquor films.

The cooling area required for gas condensers is generally based on:

5 sq. ft. per 1000 c.ft. per day for air-cooled condensers, and
3 " " " " " water-cooled condensers.

Assuming the crude gas enters the condensers at 130° Fahr. and leaves at 65° Fahr., the heat removed per 1000 c.ft. is approximately 10,000 B.Th.U. If the heat interchange be expressed in units of heat removed per hour, it will be seen that air-cooled gas condensers remove about 85 and water-cooled about 140 B.Th.U. per sq. ft. per hour.

Steam condensers of the evaporative water-cooled type remove 1500 to 2000 B.Th.U. per sq. ft. per hour when made of cast iron; and the same type will remove 2000 to 2500 B.Th.U. per sq. ft. per hour when made of wrought iron. In steam surface-condensers 8000 B.Th.U. per sq. ft. per hour are transmitted with wrought-iron tubes; and this amount is exceeded when using copper tubes. Of course, gas vapours possess physical properties very different from those of steam vapours, and the condensation of steam vapours is for many reasons much more readily obtained than that of gas vapours. Nevertheless, the existence of such wide differences in heat transmission should cast considerable doubt on the design of condensers.

Experiments to obtain data for the design of an improved type of condenser were made with quantities of gas varying from 300 to 2300 c.ft. per hour; and in the experimental condenser the rate of heat interchange was increased from 140 B.Th.U. per sq. ft. per hour, normally obtained in practice, to over 2000 B.Th.U. per sq. ft. per hour. From the data thus obtained, condensers to cool 2½ million c.ft. of gas per day have been designed, and are now in course of construction. It is not deemed advisable to give the details of these condensers at the present time; it being preferred to give actual results at a later date. It is, however, believed that the rate of heat interchange will be in the neighbourhood of 700 B.Th.U. per sq. ft. per hour.

Washing and Scrubbing Plant.

The plant used for washing and scrubbing gas also presents a subject worthy of close investigation. According to various authorities it is usual to allow as a minimum about 0·65 c.ft. of washing and scrubbing capacity per 1000 c.ft. per day. For tower scrubbers, considerably more cubic capacity is allowed; the idea being to allow the gas to travel slowly, and thus secure a long contact time for the satisfactory removal of ammonia. The quantity of water used for washing purposes in local conditions varies from 1·8 to 2·2 gallons per 1000 c.ft.; and this quantity can be worked-up to 8 or 10 oz. strength liquor. The recovery of stronger liquors from the washer-scrubbers is a matter of great importance. Stronger liquors result in a reduction of storage accommodation for liquor and of steam requirements in the sulphate plant.

Another important factor in the removal of ammonia by water is the susceptibility of the process to the effect of heat, which reduces the solubility of ammonia in water, the efficiency of the process being considerably reduced if the temperature of either gas or liquor exceeds 75° Fahr. Unfortunately, the maintenance of gas and water temperatures at less than 75° Fahr. during the summer months is a practical difficulty of no mean order. Another point which is often overlooked in connection with the recovery of ammonia is the heat generated by the absorption of ammonia by water, and the heat of formation and solution of the compounds formed by the union of ammonia with carbonic acid, sulphuretted hydrogen, and various cyanides. This matter may appear to be somewhat academic; but in practice the heat of absorption is sufficiently great to increase the temperature of the water by from 20° to 30° Fahr., depending upon the efficiency of the plant and the quantity of ammonia removed. For instance, assuming that water is supplied to a washer-scrubber at 60° Fahr., the final liquor produced may be at a temperature as high as 90° Fahr.; and at this temperature the quantity of ammonia which water is capable of retaining in solution is considerably reduced. Experiments are being conducted at the Mortlake works to determine the efficiencies of the washing and scrubbing plants. The results to date indicate that an improved type of washer-scrubbers can eventually be evolved, which should be of less cubic capacity than those now installed, and of such construction as to permit of the production of a liquor of greater strength than that now made.

Oxide Purification.

In the case of the purification of gas with oxide of iron, a wide difference of opinion exists concerning the quantity of oxide required per 1000 c.ft. of crude gas for the removal of sulphuretted hydrogen. Under local conditions, about 7 c.ft. of oxide and sawdust weighing 400 lbs. are required per 1000 c.ft. of gas treated per day; the net weight of free oxide being about 130 lbs. Theoretically, only from 0·7 to 1·35 lbs. of local oxide of iron—depending upon the quantity of sulphuretted hydrogen present—are required to purify 1000 c.ft. per day. On first thoughts the efficiency of the process would appear to be very low; but it must not be forgotten that the 130 lbs of oxide, aided by revivification *in situ*, are sufficient in practice to treat 1000 c.ft. of gas per day for a period varying from 150 to 200 days.

The fundamental reaction upon which the existing purification process is based is the oxidation of the sulphuretted hydrogen, yielding water and sulphur. The oxide of iron is used merely as an intermediary, combining with the sulphuretted hydrogen in the gas and being regenerated by exposure to air. Theoretically considered, it follows that for every 1000 c.ft. of gas to be treated, the weight of oxide required is only that sufficient to combine with the sulphuretted hydrogen present, and that after sulphiding, such oxide should be immediately removed, regenerated, and brought back for use, free from the deposited sulphur. A plant designed on such lines would be very small, and would certainly have to be of a type quite different from that now used.

It therefore seems unsound to instal purification plant of such magnitude as to provide sufficient oxide of iron to permit the continuous treatment of gas for 200 days, without renewing the reagent. Mr. E. V. Evans has drawn attention to the fact that "the physics of the process are unsound, in that a gaseous impurity at an initial concentration of 1 p.ct. by volume is extracted by a solid reagent. Again, the expenditure involved in handling large masses of solid oxide of iron accentuates the advantages that must accrue by discovering a simple process based on the use of a liquid reagent." Although the oxide purification process is eminently simple, there is evidently room for considerable improvement.

In connection with purifiers, it is well to note that the activity of the oxide of iron is not necessarily in direct proportion to its iron content. Very much depends upon its physical conditions. Various materials have been used for the purpose of lightening the oxide, such as corn cobs, wood shavings, sawdust, coke, breeze, &c. Experiments recently conducted at Mortlake on the utilization of cocoanut fibre have shown it to be of value in maintaining that openness of the mass so necessary to reduce back pressure. Among other reasons which account for low efficiencies are fluctuations in the temperature of sulphiding; the optimum being between 80° and 90° Fahr., and the delete-

rious effects of cyanogen, light tar, and oils, which render the oxide inactive.

Consumption and Storage.

The President then discussed the important question of storage accommodation. He stated that, in keeping with other Australian companies they were experiencing an increase in the consumption of gas, approximating to 7½ p.ct. While this was undoubtedly a healthy sign, marking a return to stable conditions, the nature of the load was such as to give rise to much thought. It had occasioned an inquiry into the storage accommodation required for the next few years. Certain data had been collected, and a chart was submitted showing the hourly deliveries of gas for the Tuesday in the week of maximum output during each year; Tuesday being the day on which the heaviest demand was experienced. The most important features of this chart were the gradually increasing day-load, the gas issued between 6 a.m. and 6 p.m. being 41·9 p.ct. of the total daily consumption in 1897 and 63 7 p.ct. in 1922; the gradual reduction in the lighting load, which was now very small; and the development of a peak which this year was only of about 10 minutes duration. During this the rate of output of gas amounted to nearly 15 p.ct. of the day's load—*i.e.*, equal to nearly 3 million c.ft. per hour; and the pressure exerted was 140 in. The alteration in the load curve was not unique, and had been experienced more or less by the majority of gas undertakings.

The effect of these altered supply conditions on the gas storage accommodation, he said, was also interesting. The minimum stock of gas—being that required to balance variations in the hourly rate of consumption—had been ascertained by means of graphs (which he exhibited at the meeting) for the years 1897, 1907, 1917, and 1922. He had called this minimum stock, when expressed as a percentage of the daily consumption, the storage factor.

In 1897 it was 34·6
,, 1907 ,, 23·6
,, 1917 ,, 23·8
,, 1922 ,, 21 8

For the purpose of comparison he had also prepared a chart showing the load curve of the Australian Gas Light Company and that of the Gas Light and Coke Company as given by Mr. Stephen Lacey in the "Journal" of Dec. 22, 1920 These curves were based on winter conditions, and the hourly deliveries were expressed as percentages of the daily ones. The storage factor for the Gas Light and Coke Company was 22·3 in 1919, and that of the Australian Gas Light Company 21 8 in 1922. As previously mentioned, the storage factor was the calculated minimum stock of gas required to balance variations in the hourly rate of gas consumption. In practice, of course, this minimum must be considerably exceeded for safety and smooth running. According to the experience gained at the Mortlake works, where carburetted water-gas plants were available to meet sudden increases in the demand for gas, the calculated minimum stock should be increased by one-half, while the maximum storage accommodation need not exceed three times the calculated minimum. For instance, in their own case, with a storage factor of approximately 22, the total storage accommodation need not be more than 66 p.ct. of the maximum daily load; while the minimum quantity of gas in stock at the beginning of any week should not be less than 33 p.ct At Mortlake a convenient working stock to meet hourly load fluctuations ranged from a minimum of 40 p.ct. to a maximum of 55 p.ct. for the daily consumption.

The magnitude of each unit for the storage of gas was a matter requiring careful consideration, particularly in local conditions, where corrosion played an important part in the life of holders. Several factors, all more or less dependent upon local conditions of demand, had to be taken into consideration in establishing the size of each unit of storage. It was, of course, quite impossible to detail the factors; but the principle of providing the necessary storage accommodation partly at the works and partly at various centres of the distribution system appeared to be the safest and most economical proposition.

As he had previously mentioned, the increase in gas consumption had lately been in the neighbourhood of 7½ p.ct. During the past winter the consumption on the maximum day had reached 20,550,000 c.ft.; and assuming a constant 7½ p.ct. increase, which was not new in the history of the Company, by 1925 the maximum day's requirements would reach 25,540,000 c.ft., which would be an increase of nearly 5,000,000 c.ft. per day. From a study of the curves in the graphs, one would naturally expect that this increase would be experienced during all the periods of the day on which increases had previously been experienced. Such an increase would, therefore, be derived mainly from a domestic demand. In this connection the Sunday load for the year 1922 during the winter could be tendered as an example of a purely domestic load consisting of cooking and heating, and the storage factor for this day had been found to be 23·1. In the summer of 1922, the storage factor for an average Tuesday was 26. In this case the demand might be regarded as mainly due to cooking requirements. Hence, there was every reason to believe that increased consumption, caused mainly by an increase in cookers, was likely to necessitate the provision of extra storage accommodation, thus increasing the proportion of capital required.

He had prepared a table on the assumption that the increase of the next three years would arise from one of the three following causes:

1. A load similar to that of the last few years, wherein the whole of the increase would be experienced between the hours of 6 a.m. and 6 p.m.
2. A load, probably industrial, spread evenly over each hour of the twenty-four.
3. A lighting load during which the whole of the increase would be concentrated between the hours of 6 p.m. and 6 a.m.

It would be noticed that either an industrial load or a lighting load was preferable to an increase on the existing load.

Effect of Increased Consumption on Storage Accommodation by year 1925.

Nature of Load.	Storage Factor.	Actual Minimum Storage Required.	Consumption.
		Thousands C.Ft.	Thousands C.Ft.
Present conditions . . .	21·8	4479	20,550
1. Increase concentrated between 6 a.m. and 6 p.m. cooking load	25·4	6487	25,540
2. Industrial, throughout whole 24 hours	18·2	4648	25,540
3. Increase concentrated between 6 p.m and 6 a.m. lighting load	19·0	4852	25,540

In cultivating a demand for gas for industrial purposes, the greatest competition to be met would be that of coal; and in many cases, even after allowing for the greater efficiency of gas, considerable difficulty would be experienced in establishing its supremacy. The lighting load would be a branch of business development in which serious competition would also be met; but gas as a lighting agent should not yet be regarded as dead, and on the score of cost should have little difficulty in establishing its claim. During the last few years there had been a large increase in the mileage of mains laid by the Australian Gas Light Company; new suburbs and estates in particular having been catered for. It, therefore, had become of the utmost importance that the maximum possible annual consumption should be obtained from consumers on these estates; by so doing, the capital charge in respect of mains and services would be considerably reduced.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

"OUR LIGHTING LOAD."—By E. Edison Stones.

We here conclude from p. 99 our report of the discussion which ensued from the above paper published in our columns last week.

Mr. J. D. Keillor (Greenock) thought it was up to every gas manager to see that gas lighting was spoken of more highly in the various districts. As a matter of fact, it had always seemed to him that the gas manager was afraid to speak of gas. It looked almost as if he was ashamed of gas as an illuminant. They ought to go in more for propaganda, and actually shout "Gas" from the housetops. It was because they did not do so that they were to-day somewhat low down as regarded the lighting load. In Greenock, during the past four or five years, they had done a great deal to interest the public in lighting. They had inaugurated a complete system of maintenance, which was working very well. There were representatives going all over the town and district, making a house-to-house visitation; and everywhere they made particular search for defective fittings. They examined not only burners, but boiling-rings and cookers; and their business was to see that every appliance was giving perfect satisfaction. Even if an investigation or a refitting occupied several hours, their duty was to carry it out, and charge nothing for it. A statement had been made in the discussion that in Scotland they were twenty years behind the times. He did not altogether agree with this, because a quarter of a century ago he served under an engineer who went on the principle of giving out three incandescent burners to every consumer, and by this means obtained and upheld the lighting load. To his mind the predominant question to-day was not so much efficiency in production as efficiency in use. As to plumbers, this had been a sore question in Greenock for quite a long time. About two months ago they received a deputation from the Plumbers' Society, who argued that the Town Council ought to stop the supply of fittings altogether. Indeed, they even went the length of suggesting that the showroom should be closed, because it was being carried on in direct opposition to the plumbers', gasfitters', and ironmongery shops in the town. His Committee agreed to appoint a small Sub-Committee to consider the question. They had not yet met; but he had the feeling that his Committee would support him to the extent that they would never agree to close their showroom. Certainly they ought never again to allow the plumbers and gasfitters of Greenock to have control of the fittings in the town. A week or two ago he found a shop in Greenock selling gas-burners at 6½d. each, and bought one or two and had them tested. There was no question that they gave a very good light with the 410 B.Th.U. gas in Greenock; but he was much afraid they were burners that would perish very soon. One day in a very large emporium in the town he found quantities of incandescent burners of a German make that could only truly be described as "cheap and nasty." They were being sold at 1s. 1½d. each. A test disclosed that, while the burner was capable of passing 8½ c.ft. per hour, it gave a most miserable light. As so many complaints came from people who were using these burners, it was decided to interview the proprietor of the emporium, and place the facts before him. They pointed out quite plainly that if the burners were not withdrawn the Gas Department would rig up a window of their showroom by way of an object-lesson, showing how to do it and how not to do it. Alongside the burner

using 8½ c.ft. they would place a standard Greenock burner utilizing only 3½ c.ft. of gas, and providing beautiful illumination. The study in contrast would be educative to the community, and possibly damaging to the interests of the emporium. The proprietor of the latter was impressed with the argument, for he promptly gave instructions for the immediate withdrawal of one hundred gross of these objectionable burners.

Mr. David Fulton (Helensburgh) said that the paper was admittedly a most scathing indictment levelled at gas managers. It was the view of Mr. Keillor, of Greenock, that the attack was justified; but he had considerable doubt in his own mind as to whether this was so. There might be a degree of justification for some things that had been said, but not for all. It was true that in Helensburgh he was opposed by no direct or concerted electrical opposition; but this did not preclude him from having a certain amount of competition from wealthy people who had the inclination to put down electrical plant of their own. In this connection he thought it would be interesting if he could get from Mr. Stones the form of answer to give to an individual who indicated his intention to instal electric light. Even the economics of the question did not enter prominently into such a case. Not long ago he made the remark to the general manager of one of the largest commercial undertakings in this country—"I see you intend to instal electric light. Would you tell me what is wrong with the gas?" The reply was astonishing—namely, that there was nothing wrong with it. The gentleman simply wished to have electric light for his own gratification. In his paper Mr. Stones had undoubtedly been destructive; but he would like the author to be constructive and enable him to prevent the type of consumer he had instanced from going over to the enemy. He had been somewhat disappointed with some of the remarks made by Mr. Keillor. He thought the latter gentleman would have said something advantageous to gas managers. The author had brought to their notice a large number of obsolete burners; and he had shown how necessary it was that there should be supervision of the fittings in the houses, and how essential it was that some sort of maintenance system should be kept up. With every word the author had to say in this connection he was in agreement. Was Mr. Stones satisfied that the most modern burners obtainable to-day were all they ought to be? He had visited houses where the lighting was efficient, but where the consumers were troubled with noise. Very often in the most modern type of burners they got an efficient but noisy light. He was inclined to put the blame for this on the form of injector which was invariably adopted by manufacturers in this country. There was necessity for searching experiment in this direction. To many undertakings, lighting was not the main load. In such works a large sum of money might be spent on the lighting load for a comparatively small return; while the same amount of expenditure incurred in opening up new fields and increasing the uses of gas for cooking and heating might, in the long run, prove more profitable.

Mr. W. M. Mason (Manager of the British Commercial Gas Association) remarked that, while in the main he agreed with the conclusions of the author, there were suggestions in the paper from which he dissented. He was disposed to say that, unless the gas industry adopted some of the methods the author advocated—particularly with regard to maintenance—it would be infinitely better without the lighting load. He would undertake to assert that in Edinburgh or Glasgow—or, indeed, in any modern town—there was an infinite variety of horrible advertisements for gas which stared the public in the face. Speaking for himself, he did not regard the lighting load as the most important section of the industry, which had four main props—namely, lighting, cooking, heating, and power. Unless they agreed to a general scheme of maintenance or inspection which would be universally adopted and applied, the industry would do better to allow lighting to go altogether. Competition was one of the best factors that could enter into any business; but if they were to compete against their rivals they must adopt modern methods. Mr. Stones had emphasized the darker side of the picture. He desired the members of the North British Association to take notice of the further fact that the gas industry at the present moment was going ahead by leaps and bounds. Within the last decade it had quadrupled its resources. There was a magnificent future for lighting, if they proceeded along systematic and proper lines. Two great essentials, it seemed to him, ought to be kept in view—the necessity for maintenance and the importance of demonstration. These must ever be kept in the forefront, if the lighting load was to be retained. The "B.C.G.A." had a splendid selection of "ammunition," for those who were out to tackle the lighting business properly. Quite recently—within the last twelve months—a Lighting Committee had been appointed who were working on the standardizing of burners. It was interesting to note that many of the points the Association had been discussing that afternoon had already been investigated and worked out by this Committee for the good of the industry. Glasgow officials were to be complimented on the fine lead they had given with their free maintenance scheme.

Mr. Nicolsen (Messrs. W. Sugg and Co., London) did not think they had made quite enough of their opportunities within recent years. Perhaps there might be some fields which they had to concede to electricity; but they had never conceded an iota in one particular field—the lighting of streets like Princes Street in Edinburgh. It had been shown by manufacturers and specialists in the industry that they could give the most effective, artistic, and economic form of lighting possible for public streets.

Mr. Stones, in the course of his reply, said that, generally speaking, the criticism of his paper had not been altogether of the type he had courted and desired. He was afraid the discussion had got on to side-tracks. What he had set out primarily to create was an atmosphere of fight, and not of funk. He would describe Mr. Fulton's policy as one of funk. Many a time he had found himself wondering what it was that could possibly shake the industry up. In the course of the debate, the statement had been freely put forward that gas lighting was losing ground, and that, as a consequence, they should stand by gas heating. His answer was what Mr. Mason had remarked—"We have four props." If this was the position, then they ought to strive to keep the lot.

The proceedings terminated with a vote of thanks to the author.

SCOTTISH JUNIOR GAS ASSOCIATION.

Annual Meeting of the Western Juniors.

The Annual General Meeting of the Western District of the Scottish Junior Gas Association was held on April 7, in the Royal Technical College, Glasgow—Mr. W. J. Lennox, the Branch President, in the chair.

Annual Report.

The Branch Secretary (Mr. A. B. Munro) submitted the annual report and financial statement, both of which were unanimously approved. The financial statement showed that the income for the year amounted to £143, and after meeting all expenditure, there was carried forward a balance slightly in excess of £55.

Following a discussion, the Council unanimously agreed to allocate a sum of £10 for the purchase of additional books for the library.

Office Bearers.

Office-bearers were elected for the ensuing session as follows:

President.—Mr. Andrew Walker, Kilbarchan.

Vice-President.—Mr John M'Isaac, Walls Street Station, Glasgow Corporation Gas Department.

Secretary.—Mr. A B. Munro, Glasgow Corporation Gas Department (John Street).

Auditors.—Messrs. Melvin (Dalmarnock) and Beveridge (Troon).

Council.—Messrs. Sturrock, Hall, Morrison, M'Intyre, Kerr (two years), and Graham (one year).

WORKING COSTS.

The President said it gave him great pleasure to introduce to the meeting his old friend and former chief, Mr. W. Wilson, Engineer and Manager of the Burton-on-Trent Gas Works. He had come to Scotland specially to address them on the subject of working costs.

Mr. Wm. Wilson said he did not purpose that evening to ruminate on their Association—of which he had been one of the first Presidents—but to fulfil a promise to the President, Mr. Lennox, and to talk to them about working costs. The choice of the subject was not entirely his own, but he could appreciate the fact that it was away from the well-beaten track of gas engineering subjects, such as vertical retorting, high-pressure distribution, reinforced concrete purifiers, &c. His subject was one which he felt would appeal to the majority of the members. There was no doubt that working costs were of the utmost importance to the manager of an undertaking, no matter how small the concern might be. He appreciated the fact that the man in charge had a better chance of obtaining and summarizing such costs. It was this fact, and the remembrance of how much he desired a knowledge of this matter in his younger days, which prompted him to mention the subject to the President. In a general way he proposed to deal with the method of arriving at the cost of manufacturing gas. He did not intend to go into the details of such costs as main and service laying, the connecting-up of cookers, &c., as no two jobs were alike, and the cost in each case must be worked out individually.

Working costs may be classified and divided *ad lib.*; but mainly they consist of manufacturing and distribution costs. Dealing with the former—and they are by far the most important—the geographical position of a works, and the lay-out or general facilities of the plant, bear very largely on manufacturing costs. On geographical position depends largely the prime cost of coal, and possibly, to a lesser extent, the return from residuals. On lay-out depends the cost of handling materials on the works; and no two works are alike in this respect. Now with regard to the question of arriving at the cost of manufacturing gas—*i.e.*, price per 1000 c.ft. into the holder, different managers have different methods. I have a preference for having such costs worked monthly, adhering to the calendar months in preference to a group of four or five weeks.

It is surprising to find how many Corporation undertakings are still content to run through a whole financial year without knowing how they stand and whether there will be a profit or loss. This is specially the case where the financial side is not under the control of the manager, he being only responsible for the supply. Such dual control is as a general rule bad from the point of view of arriving at working costs, and often necessitates the manager's keeping extra clerical staff and a duplicate set of books in order to arrive quickly at the monthly expenditure. I mention this so that you may expect difficulties of this sort when you obtain those appointments you so much desire.

Accurate stocktaking each month is needed in order to arrive at the exact quantity of coal used and residuals made, accurate records of coal received and residuals sold, and a true analysis of wages. These records may seem to entail a needless amount of work, but in my opinion the result amply justifies the trouble.

Stocks.

Stock-taking necessitates the calibrating of coal stores, tar wells, tanks for oils and acid, &c. Coal stocks generally consist of coal in stores and heaps, in hoppers, and in trucks (*i.e.*, all trucks standing under load and advised from the colliery but not received, two or three days usually elapsing before these arrive, when weight can be verified and the total coal stock arrived at). The best way of arriving at the tonnage of coal in heaps is to make a careful note of each truck emptied thereon, and when the

heap is being used-up, each cart or truck received therefrom should be weighed. Failing this, I use Mr. Newbiggin's figure of 45 c.ft. per ton. Coal stores I generally have levelled-down at the first of each month, and as far as possible trimmed to triangular or square formation to facilitate easy mensuration. Regarding coal in stock in hoppers, this is the most difficult to arrive at with accuracy. I had a row of twelve hoppers, each of which held twelve tons, when levelled up to the top. When filled up by a push-plate conveyor, without levelling, they held ten tons; but when emptied, about two tons clung to the corners, particularly with small wet coal, and could only be got out by hand scraping. The actual working capacity therefore was about eight tons. With vertical retorts having large hoppers to hold a forty-eight hours' supply, the trouble is aggravated. The best method is to have them full at stocktaking time. Failing this, have them levelled-down, and measure the empty space above the coal and so arrive at the coal content by deduction. Another point about coal stocks is to keep a priced stock-sheet showing the tonnage of each different coal in a particular heap at its particular price. This is useful when you require to withdraw coal from such a heap.

Coke Stocks.

These are usually measured, and are more difficult to arrive at, for hardly two qualities of coke occupy the same space per ton. In the old days when I was at Kirkintilloch and Coatbridge, making smithy char, 75 c.ft. per ton was what I allowed; but at Falkirk, with machine-stoked horizontals with fairly heavy charges and longer duration, 60 c.ft. was the figure. With verticals, 80 to 85 c.ft. is about right. A convenient method of arriving at the correct figure is to fill a railway truck (after measuring inside cubical capacity) exactly level with the top, and weigh the contents. When taking stock of coke in heaps, it is somewhat difficult to allow for the probable quantity of breeze and dust content. This is a matter on which experience alone can guide. I have had experience of breeze and dust products ranging from under 5 p.ct. up to 35 p.ct. of the total quantity made.

Tar.

This figure is easily obtained in gallons or in tons (200 gallons to the ton). It is usual to have the capacity of tar wells and stocks calculated in gallons per inch or per foot depth. These are dipped on the first day of each month, and the measurement so taken is converted into gallons or tons by reference to the aforementioned table of capacities. For the purpose of getting at the quantity of crude tar made per ton during any one month, the quantity of dehydrated tar is calculated back to crude by simply adding 15 p.ct.

Ammoniacal Liquor.

This is also obtained easily, but is rather more difficult to value, specially if sulphate of ammonia is made, as it might happen that during one month no salt is made, whereas much may be made in the following month. The latter month would then show an inflated yield, while the former month would show none. I find it fairest to state all ammonia made as sulphate. In our own case we are not at the moment making sulphate, as we find concentrated ammoniacal liquor more profitable. This has an average ammonia content of 13·51 p.ct. It takes 1400 gallons of 10-oz. liquor to produce one ton of the concentrated liquor. Further, with regard to stocks of ammoniacal liquor, the liquor is tested by distillation for strength, and the volume is corrected to bring it to a basis of 10-oz. strength; thus making the stocks in succeeding months comparable. 220 gallons of crude liquor are reckoned as one ton.

It is sufficient to value the stores once a year for the annual accounts.

The Cost Sheet.

The cost sheet is still worked-out per 1000 c.ft., as we are not charging on the therm basis. It is based on the gas made. The coal consumed is then got at by taking the coal in stock at the beginning of the month *plus* coal received, less the stock at the end.

I must now refer to the effect of railway carriage on the delivered price of coal. Generally speaking, every shilling per ton of coal represents one penny per 1000 c.ft. made in horizontals (at 12,000 c.ft. per ton), or ¾d. per 1000 c.ft. in the case of verticals. In my own case at Burton, the average railway rate per ton of coal is 7s.; while wagon hire is 1s. 6d. per ton, representing 8½d. per 1000 c.ft. made when working on horizontals, or approximately 6d. per 1000 c.ft. when working verticals with a make of 16,000 c.ft. per ton. We have forty 12-ton trucks of our own, and carry about one-third of our coal supplied therein; thus saving 1s. 6d. per ton. With an average of one run per week, the saving is 18s. per truck per week. We have found them most profitable. I mention these questions of railway rates and wagon hire because they are of great importance.

To the cost of coal we add the cost of other materials used—oxide for purification, electricity, team work and shunting, fuel and lime, acid for sulphate making, fuel for tar dehydration and fuel used on boilers. This gives us a gross cost for materials per 1000 c.ft. of gas made. From this we deduct the value of the residuals made, and then add all salaries and wages. The item of oxide might quite well be omitted, as spent oxide largely pays for new oxide, and it is impossible to value oxide in process; also when oxide is bought or spent oxide sold, it shows large sums at irregular intervals and upsets a fair comparison. Electricity is purchased from our sister department at 1½d. per unit. It is used for wagon tipping, coal breaking, coal and coke elevating and conveying, and coke screening. No check meters are used, so that it is impossible for us to apportion the consumption for each purpose.

Except in the case of sulphate of ammonia, residuals require no comment. Acid used may be hypothetical. In our case we make concentrated liquor, so acid errors are eliminated.

With regard to fuel used on boilers, I have found it necessary on several occasions, when the production of coke dust was not sufficient to supply the requirements at the boilers, to purchase cheap slack or dross for boiler firing. This is a matter on which I never hesitate, as it must be obvious that it is much cheaper to utilize a cheap slack than consume good coke.

I divide wages into manufacturing, bye-products, repairs and maintenance of works, and management. Such cost statements become doubly interesting after the first year, when you are able to get comparison with the corresponding previous month.

Gas sold is estimated from the quantity of gas sent out, less that used on works as metered, less also 5 p.ct. (4·4 p.ct. last year) unaccounted for. The estimated sales we value at our price to ordinary consumers, 4s. 6d. per 1000 c.ft. This is 1½d. per 1000 c.ft., under our average selling price when taking in prepayment consumers and outside districts.

I might mention that we do not correct our volume of gas made to normal temperature and pressure, as from experiments I have made there is very little difference in our gas (not more than 5 p.ct. all the year round) between the temperature at which the gas is registered in our station meter and that when it reaches the consumers' meters. This represents 1 p.ct. of the volume. No doubt such corrections would enable one to show, as a general rule, a reduction in the gas unaccounted for; but they have really no effect on the selling price of gas.

In conclusion, I have avoided going too much into detail in the matter. My sole aim has been to point the way; and if I have awakened or stimulated your interests on this important subject, I am more than repaid for the little trouble I have taken in preparing this address.

LOW-TEMPERATURE CARBONIZATION.

A paper which suggested a new method of low-temperature carbonization was read by Mr. J. Stanley Morgan, M.Sc., at a special meeting of the Northern Section of the Coke-Oven Managers' Association on March 24.

The author said he believed the treatment of coal by low-temperature carbonization was right and profitable, but not by present processes under boom, which he thought were not capable of effecting the desired end at a reasonable capital cost. In 1918, in common with others, he happened to be up against the difficulty of heating charcoal. They had tried thin layers, gas circulation, and everything else they could think of, without success; but a process was finally devised at Skinningrove in which the charcoal was completely immersed in molten lead. Heating to the required 350° C. took fifteen seconds, as against four hours. Since that time, with the assistance of Messrs. Woodall, Duckham, and Jones, Ltd., who formed a Research Committee to exploit the process, the lead bath had been successfully applied on a large scale to the distillation of coal-tar oil and many other things. He had used it for such widely different purposes as alkali fusion, for synthetic phenol and beta naphthol, and the drying of many other things, including coal. He believed it would find still more uses; but it seemed to him the most obvious way to distil coal.

With a properly designed bath the throughput would be enormous, because the time-factor was so low. With powdered coal, he should suggest nothing else. The factor would be of the order of two minutes, as against hours in other processes. By taking care to have the whole of the lead in motion, a very efficient heat transfer was effected. They got a very rapid distillation, each particle of coal was treated equally, the gas vapours got away quickly, and little or no cracking ensued. The liquid products were very fluid, containing little pitch and of excellent quality. The yield of petrols was greater than that of benzoles by the higher-temperature process. The gas was of high quality, about 750 B.Th.U.; and, as it was only formed to the extent of about 4500 to 5000 c.ft. per ton, the condensing capacity was reduced to the minimum.

They had therefore a retort which was of low capital cost, because of its high rate of treatment, and a condensing plant of smallest dimensions. They should produce a saleable fuel which would give smokeless fires, but which would burn pleasantly. The semi-coke would be excellent for steam raising—better than coal. The gas would be far better in every respect than that at present distributed. It would be richer, less poisonous, and less liable to choke in mains, no naphthalene being present. It would cost less to purify, containing no high-temperature sulphur compounds such as carbon bisulphide, and it would be cheaper. There would be a large quantity of ammonium sulphate formed in the primary distillation; and since subsequent treatment in the producers would be simple owing to the absence of tar, it was probable that a very large total increase would result.

He did not think the problem was so simple as washing coal; but he was just as certain that it was not so difficult as making metallurgical coke in ovens. If the process he had outlined did not fill the bill, others would be devised. When the right process was found, nothing would prevent its rapid extension.

RESEARCH SUB-COMMITTEE OF THE GAS INVESTIGATION COMMITTEE OF THE INSTITUTION OF GAS ENGINEERS.

The "Fairweather" Recording Calorimeter.

EIGHTH REPORT.

(*Continued from p.* 107.)

THERMAL MEASUREMENTS.

The mercury thermometers supplied with the "Fairweather" Recorder are of excellent construction and finish, being divided in tenths of a degree up to 50° C. We find it an advantage to use a reading lens of the pattern described in the "Notification" even for ordinary work where readings to the nearest half division, *i.e.*, 0·05°, may be sufficiently accurate.

Calibration certificates from the National Physical Laboratory or the Reichsanstalt are issued with each thermometer giving the necessary corrections at 10° intervals. While this is a step in the right direction, our experience shows that calibration at closer intervals is very desirable, say every 2° interval to 0·02° C.

The differential recording air thermometer is an example of high-class workmanship. If the air chambers are sealed in the manner recommended by the makers and inlet water temperature to the calorimeter is constant, we find that the movement of the pen on the chart is very closely proportional to the temperature rise in the calorimeter.

If, however, inlet water temperature changes, the *temperature rise* within the calorimeter remaining unaltered, there is a movement of the pen to the extent of several B.Th.U.s for a permanent 10° C. rise of inlet water temperature, and the ratio of B.Th.U.s on chart to B.Th.U.s deduced from measurement of temperature rise, changes slightly. Both these changes are to be anticipated upon theoretical grounds, and consideration of the manner of sealing and using the air chambers, but a little more experimental work is necessary before treating this point in greater detail. It is certain, however, that irregularities in behaviour of the differential air thermometer are to be expected if the air chambers and aneroids are not thoroughly dry internally before sealing.

The makers state that with the cylindrical air chambers used on their earlier instruments there was some distortion and change in capacity when the pressure of the water on the inlet air chamber varied. (Private communication.) They considered the use of the stouter metal for the chambers to be inadvisable, as hindering the rapid transmission of heat to the air within.

The present air boxes are hemispherical in form with a re-entrant portion for the reception of the mercury thermometer. It seems to us that the newer form is more likely to change in capacity under the influence of pressure changes than the old, being in fact like a simple form of aneroid chamber. Nevertheless, we find that the variation in capacity of the air chambers with variation in external pressure is quite negligible, for with an increase in external pressure on the inlet air-box equivalent to a column of water 5 ft. high, the pen moved barely 1 B.Th.U. on the chart. In practice the construction of the instrument would not allow the pressure to build up more than 6 to 8 ins.

The surrounding water chambers are still of the form used with the cylindrical air chambers, and this leads to minor disturbances of the record under certain conditions due to eddy currents in the lower portions of the water chambers, where the temperature may be slightly different from that in the "live" stream of water immediately round the air-boxes. A perforated distance-piece soldered in the old air-boxes would in all probability have given the necessary stability to the chambers. The response of the air thermometer to temperature changes is very rapid, the chart often indicating a change before it has been shown on the mercury thermometers.

At any time, the accuracy of the working of the air thermometer can be checked by observing the temperature rise on the mercury thermometers and comparing the equivalent B.Th.U. value as given by the makers' table. It is important to note that the value obtained from the table does not represent the C.V. of the gas, unless both gas and water flows are strictly correct. Whatever the latter may be, however, the air thermometer can be verified at once by reference to the table as above. The table referred to is given at the end of Appendix 1*.

CALORIMETER.

This is of the usual Boys type with minor structural alterations to accommodate the hot bulb of the differential air thermometer.

The burner is supported somewhat differently and air enters by a central passage beneath the calorimeter instead of through a series of holes in the wooden base of the calorimeter. The tubing is of somewhat larger diameter than in the usual Boys' calorimeter, and in one or two details the internal construction has been improved. The water system has been provided with an ample number of air-vents at suitable points and throughout our tests has worked very satisfactorily.

At intervals of about three weeks it has proved necessary to disconnect the calorimeter and thoroughly wash the insides of the coils because the water pressure in the inlet-water sight-tube was building up too seriously. This, however, is due entirely to the character of the available water supply, and ordinarily a much longer period without cleaning would be expected.

Air Supply to Calorimeter and its Saturation.—The problem of saturating with water vapour the air supplied to the calorimeter is exactly the same as that of the calorimeter discussed in the Fifth Report, p. 207, and no fresh discussion is necessary.

The means provided for the saturation and cooling of the incoming air are well thought out and effective. Air enters by a side-arm of the jacket surrounding the water-tower and by the time it reaches the calorimeter is found to be saturated with water vapour at the temperature of the water supplied to the calorimeter.

When using a 500 B.Th.U. gas, we found that 6·3 c.ft. of air were being passed through the calorimeter for each c.ft. of gas burned. This probably represents a reasonable excess of air for the grade of gas used, and it was possible to stop up two of the five exit holes provided for the escape of the products of combustion before the charted C.V. was visibly affected, or signs of imperfect combustion could be detected.

There is some little doubt, however, as to the adequacy of the air supply in the case of very rich gases. If water below room temperature is circulating through the apparatus, the cold column of air round the water tower appreciably assists the draught through the calorimeter.

If, however (as was usually the case in our experiments using the continuously circulating water supply), the water temperature is slightly above room temperature, the warm air round the water tower acts as an up-cast shaft opposing the draught through the calorimeter, and as the column is of considerable height, may cause a serious falling off in the supply of air to the calorimeter. Care must, therefore, be taken to see that the water temperature is at, or slightly below, room temperature. The makers state that the products of combustion leave the calorimeter some 4° C. above inlet water temperature, and show that the error introduced is practically negligible in most cases.

With the instrument supplied, we have usually found the temperature of the outgoing products of combustion to be 6-7° C. above inlet water temperature. Even with this difference the loss of heat rarely exceeds the equivalent of 1-2 B.Th.U.s per c.ft.

(*To be continued.*)

* This will be given in a later issue of the "JOURNAL."

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Annual General Meeting and Visit.

Prior to the Annual Meeting of the Association, on Saturday afternoon, April 7, there was a visit to the meter works of Messrs. Willey & Co., in Saville Street, Manchester. There were over a hundred members and guests present.

These works were opened in May of last year, and bid fair to be the largest and best of the firm's branches. The new premises are 144 ft. long and 30 ft. wide, three storeys in height, and well lighted. The offices are on the ground floor, and at the other end there is ample provision for loading, receiving, and dispatching goods. The firm of Messrs. Willey & Co. have had a long association with gas engineering in the West and South-West of England. Their chief works are at Exeter; and everything is made on the premises from the raw materials. Constructional ironwork of various kinds is turned out—including gasholders, purifiers, condensers, scrubbers, and meters, as well as other plant necessary for installations of gas supply for lighting, heating, cooking, and motive power. They have also large meter factories in London and Leicester; and their ever-increasing trade in the North has necessitated this branch in Manchester.

The firm's representative in Manchester, Mr. J. H. Roby, met the members and conducted them over the premises. He was accompanied by Mr. T. Glanfield (Director), Mr. L. Truscott, Darlington (North-East Coast Representative), and Messrs. F. Woolcott, W. Pennington, and M. A. Pedlar (of the staff).

Tea was served at the Grosvenor Hotel, the members of the Association being the guests of the firm.

Mr. F. B. Small (Liverpool) moved a vote of thanks to Messrs. Willey and their representatives, who had done their utmost to bring about a successful visit. He had noticed several pieces of apparatus marked "Patent applied for," which showed that they were a very enterprising firm. He was surprised at the shilling slot-meter box being able to hold as many as 500 coins.

Mr. H. C. Applebee (Manchester) seconded.

Mr. G. Dixon, Lancaster (President), in conveying the resolution to the firm, said he must express his personal pleasure at being present that afternoon. He had brought with him his Chairman, for two reasons. One was that when the members paid their visit to Lancaster the Chairman was out of the country, and had always felt regret at not seeing the members. The other was that his Chairman had wished to know a little more about gas-meters; and the visit that afternoon was a fine opportunity. He complimented the firm on their new depot.

Mr. T. Glanfield, in reply, expressed his pleasure at seeing such a good number there that day. The firm were not strangers to Manchester, as they had had a depot there for thirty years. It used to be said that profits were made in the retort-house. He suggested that the accuracy of the gas-meter was a very important factor, and one that was well recognized now. If any of the members should be in the neighbourhood of Exeter, and called in at the works, the firm would be pleased to show them anything they had which was of interest or help. There were great possibilities for the gas industry.

The Business Meeting.

Mr. J. Alsop (Hon. Secretary) read the report, which showed that the number of members in April last year was 195. Since then 37 new members have been enrolled, 14 have resigned, there have been 2 deaths, and 4 have ceased to be members according to rule—leaving the total membership at 212, or an increase of 17. Travelling expenses of members attending the meetings have been granted by the following undertakings: Runcorn, Nelson, Stalybridge, Ormskirk, Hyde, Burnley, Radcliffe, Blackburn, Liverpool, Salford, Warrington, Manchester, Lancaster, and Preston.

Election of Officers.

The following officers were elected for next session.

President.—Mr. J. H. Clegg, Burnley.
Senior Vice-President.—Mr. G. H. Dixon, B.Eng., Assoc.M. Inst.C.E.
Junior Vice President.—Mr. H. Stone, Birkenhead.
Hon. Secretary.—Mr. J. Alsop, Bolton.
Hon. Treasurer.—Mr. D. T. Livesey, Stretford.
Auditor.—Mr. H. N. Holton, Manchester.
Members of the Council—Messrs. J. Albinson, Manchester; J. Hailstone, Rochdale; I. H. Massey, Oldham; and J. Robinson, Altrincham.

A vote of thanks to the Council for the work of the session was moved and seconded by Messrs. D. T. Livesey and R. Prince respectively, and replied to by Mr. J. B. Stewart.

Mr. Dixon, in his reply to a vote of thanks for his services as President, expressed his indebtedness to the Technical Press, the Manchester Seniors, and the Council.

The usual social evening was subsequently held; most of the items of music and song being contributed by members of the Association.

Southern Association of Gas Engineers and Managers (Western District).—The next meeting is to be held at 3.30 on Thursday, May 24, at the offices of the Plymouth Gas Company, George Street, Plymouth.

PRODUCER GAS AND GAS-PRODUCER PRACTICE.

In the "Journal" for Feb. 21, p. 452, there were published a few notes upon the first part of a contribution from the pen of Prof. R. V. Wheeler, D.Sc., entitled "Producer Gas and Gas-Producer Practice" which appeared in the January issue of "Fuel in Science and Practice;" and in the March publication this is continued. The action of carbon dioxide upon carbon is further considered in relation to the speed with which equilibrium is reached. It is pointed out that the rate of reaction between carbon dioxide and carbon depends essentially upon two factors—viz., the temperature of the carbon, and the character of its surface; while the amount of carbon dioxide reduced by a given quantity of carbon at a given temperature depends upon the length of the heated column of carbon, and the size of the particles contained in it, together with the rate of passage of the carbon dioxide—both of which determine the time of contact between the reacting bodies. Prof. Wheeler then continues with a consideration of the rate of this reaction at different temperatures, and mentions the work which he did in collaboration with Rhead on this subject. As a result of these experiments, the conclusion arrived at was that the velocity of the reaction increases with temperature; the mean velocity ratios for a temperature interval of 10° C. diminishing fairly regularly as the temperature scale is ascended. A curve prepared from the results shows that for a time of contact of one second, such as can be presumed to be common in gas-producer practice, a temperature of at least 1200° C. must prevail in the fuel-bed, if a nearly complete reduction of carbon dioxide is to be obtained.

Having considered the influence of temperature, the author next regards the rate of reaction with different varieties of carbon. Mention is made of the work of Lowthian Bell and Boudouard in this connection, from whose results it would appear that wood charcoal is more reactive than metallurgical coke or retort carbon. It may be said that the coke formed from a good durain in the upper part of a gas-producer approaches closely to wood charcoal in its reactivity. Finally, there is the time of contact, which is a function of the amount of carbon surface exposed to the gas and the rate of passage of the gas current. The amount of carbon dioxide reduced will, of course, be greater the smaller is the size of the carbon particles. Figures obtained by Clement, Adams, and Haskins, using coke as fuel, are shown in the article in graphical form. Taking all the factors into consideration, it is concluded that, in order to ensure that the maximum quantity of carbon monoxide shall be obtained in practice by the action of air on carbon:

(1) The temperature of the fuel bed should be high, probably between 1150° and 1200° C.
(2) The fuel should be porous, and of small size.
(3) The blast-pressure should be low, and the speed of passage of the blast through the fuel-bed should be slow.
(4) The fuel-bed should not be too thin.

Practical considerations in individual installations will place a limit to the extent it is possible to go in any efforts to obtain a high yield of carbon monoxide. The highest temperature permissible with the fuel-bed will be determined largely by the fusibility of the ash in the fuel; the size of the fuel will be governed by the consideration that the smaller are the pieces the greater the pressure required to force the blast through (and the higher will be its velocity through the fuel bed); the speed of passage of the blast will be determined by the rate of gasification of fuel required, and will therefore depend upon the design of the gas-producer, more particularly on its grate-area; while the depth of the fuel-bed will be limited by the necessity for guarding against the formation of air-channels if it is too small, or of clinker if it is too great, and will be decided mainly by the character of the fuel.

The article deals with the action of steam upon carbon, by which reaction the heat developed within the producer by the action of air on carbon can be recovered. By the use of steam, a great part of the sensible heat within the producer can be converted into potential heat which can be transferred to furnaces without loss. Inasmuch as the action of steam on carbon is endothermic, the use of steam is limited by the fact that a fairly high temperature must be maintained in the fuel-bed, in order that gasification may proceed at all. The maximum quantity of steam that can be usefully employed in the blast depends largely on the use for which the gas is required; for some purposes the presence of a high proportion of hydrogen is objectionable, and except in the special circumstances in which the recovery of the nitrogen in the coal as ammonia is attempted, it is undesirable that the temperature of the fuel-bed should fall much below 1000° C. In practice, the unavoidable loss of heat from the producer by radiation and by the sensible heat of the gases and of the ashes makes it necessary to use a greater proportion of air to steam than is theoretically necessary.

In conclusion, the reversible reaction of carbon monoxide and water-vapour is considered. For any given temperature, the equilibrium values can be expressed in terms of the concentration of the reacting gases of the product of the concentrations of carbon monoxide and steam bearing a constant ratio to the product of the concentrations of carbon dioxide and hydrogen. The water-gas equilibrium was studied in detail by Hahn; and some of his results are included in the article. From these results, it is pos-

sible, given the percentage composition of a mixture of steam, hydrogen, carbon dioxide, and carbon monoxide, to determine whether, and in what direction, any change will take place in the system at a given temperature, and what will be the effect of adding more of one of the reacting gases. These considerations are of importance in relation to the use of producer gas in furnaces.

We may repeat our previous remarks—that the contribution is of great utility to the student and the practical man alike; and it is most fitting that the author of such an article should be an authority upon the subject, and one who has the work at heart.

THE FIXATION OF NITROGEN.

Before the Royal Society of Arts, on Monday evening of last week, Mr. E. Kilburn Scott, Assoc.M.Inst.C.E., M.Inst.E.E., delivered the first of a series of three Cantor Lectures, on "The Fixation of Nitrogen"—a subject upon which he presented a paper to the Society some ten years ago. Since then he has spent four years in America, where a great deal of attention has, of course, been devoted to the matter.

He pointed out that the use of inorganic nitrogen is increasing at a tremendous rate. In fact, it is stated that it is doubling every ten years. The virgin soils of the world are gradually being used up; and the period that was required to leave the ground fallow under the old practice, is now considered a waste of time, so that farmers are using that method less and less. There are two ways in which Nature supplies the soil with fertilizer—one of them by lightning storms. It has been estimated that they bring down about 100 million tons of fixed nitrogen a year, which is more than is wanted; but very much of it drops into the sea and on mountains, &c., where it is not needed. The other method is by means of bacteria. The uses for nitrates are roughly: As a mixed fertilizer about 28 p.ct.; as an unmixed fertilizer, 17 p.ct.; for sulphuric acid, 17 p.ct.; for nitric acid, 12 p.ct. The other uses are for dyes, explosives, glass manufacture, and the fine chemical industry. Of all the leading countries of the world, we in Great Britain have done the least to get ready against another war. We were right behind at the beginning of the last war; and there has not been a great deal done since. Yet much has been accomplished elsewhere. It is very dangerous to depend upon Chili nitrate from overseas.

In 1913, there was one plant working the Haber synthetic ammonia process and turning out 7000 metric tons of nitrogen a year; and in 1921 the output was over 300,000 tons. In the former year there were fifteen plants making cyanamide, and producing 16,000 metric tons of nitrogen a year; this figure having grown in 1921 to 266,000 tons. There were in 1913 seven plants in the world making nitrates by arc and miscellaneous processes, and turning out 18,000 tons a year. This had gone up to 34,000 tons in 1921. Not one of these plants was at work in this country.

The electric-arc process is in use in a number of countries; and the lecturer described, by the aid of diagrams, the types of furnaces employed. He expressed the opinion that a furnace with a moving part to get the arc flames is at a disadvantage as compared with those that do not require such movement. His own furnace, of which he gave some particulars, has three electrodes, so as to take a three-phase alternating current. Another furnace—a Swiss one—to which he drew attention, also on the three-phase principle, is, he said, giving remarkable results. Having gone over the various types of furnaces, he pointed out how these differ from others intended for making carbide of calcium; these differences being very great. It is, he said, a much easier proposition to build large furnaces than small ones, and also much easier to work them. That is why the Norwegians are going in for big installations. The furnaces, though giving a low percentage efficiency, are nevertheless commercially efficient.

At the close of the lecture, an excellent series of lantern slides illustrative of different installations was shown.

A Turbo Gas-Booster at Poole.—Messrs. Reavell & Co., Ltd., of Ipswich, have built and installed at the Poole works of the Bournemouth Gas and Water Company, for the purpose of delivering gas to holders 6500 yards distant, a turbo gas-booster designed to deal with 360,000 c.ft. of gas per hour at a delivery pressure of 42 in. water gauge. The running trials were attended by "The Engineer," in the pages of which a full description of the machine, accompanied by illustrations, has since appeared. The booster (which is driven by a six-cylinder high-speed vertical "National" gas-engine) is a single-stage one, with the impeller running to 3600 R.P.M., in a volute casing having a 16 in. diameter suction branch, and discharging to a 24 in. main through a 12 in. delivery pipe. The most interesting feature of the installation, says our contemporary, is the Matteucci patented speed transmission gear, which is built on to the booster volute casing. Messrs. Reavell have obtained the manufacturing rights in connection with this gear, the present application of which is a new one. The gear is of the positive reaction type; and rollers, working on the sun-and-planet system, are employed to bring about the desired change of speed. Throughout the trial, the gear worked in a very satisfactory manner.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report of the Chairman for the Year 1922.

In February last the provisional definitions of photometric terms and units proposed by the British National Committee were published, together with a prefatory note, and have been officially adopted by the three constituent Societies. They also form the basis of a set of photometric definitions shortly to be issued by the British Engineering Standards Association as part of a comprehensive set of electrical engineering terms.

The definitions in question, while agreeing with the decisions of the International Commission on Illumination held in Paris in 1921, go considerably further, and are in some respects at variance with a set of definitions approved in July, 1922, by the American Engineering Standards Committee. The occasion of a visit by Dr. Clayton Sharp to this country in December last was seized upon to discuss these definitions with one so largely instrumental in the drafting of the American definitions. Dr. Sharp kindly consented to attend a meeting of the Nomenclature Sub-Committee; and as a result of this interchange of views, the Sub-Committee are now considering how the proposed definitions can be amended so as to minimize the points of difference between this country and the United States. A preliminary list of symbols has also been prepared by the Nomenclature Sub-Committee; and, after submission to the British Committee, these have been communicated to a number of interested Societies, publication being deferred until their criticisms (if any) have been considered.

Dr. Mailloux (U.S.A.) and Mr. K. Edgcumbe (Great Britain) were asked by the Central Office of the National Illumination Commission to prepare an English translation of the French official text of terms and definitions adopted in Paris in 1921. A meeting was held in this country and the translation agreed upon. The text forms an Appendix to this report.

At the 1921 Paris meeting of the Commission, an International Committee on Automobile Headlights was appointed, and Mr. K. Edgcumbe was subsequently nominated by the British National Committee as their representative thereon. A fairly complete set of recommendations having been drawn up in the United States by a Committee under the Chairmanship of Dr. Clayton Sharp, the subject was discussed with that gentleman on the occasion of his visit to this country; and at a subsequent interview with Mr. Perrin of the Ministry of Transport, the question was raised of how the British National Committee could best serve the interests of this country in connection with automobile headlights. It appeared that the most useful course would be to appoint a Sub-Committee to consider the recommendations which had already been published in other countries, with a view, if possible, of arriving at common agreement through the medium of the International Headlights Committee.

In view of the fact that a large and increasing part of the work of the British National Committee relates to standardization, it was decided, with the approval of the three constituent Societies, to ask the British Engineering Standards Association to form a Sectional Committee on Illumination to which such matters could be referred. It is proposed that this Committee should deal solely with standardization or similar questions referred to it by the British National Committee, all international matters being dealt with by the National Committee as heretofore.

K. Edgcumbe,
Chairman.

Jan., 1923.

APPENDIX.

Photometric Definitions.

Official Translation of the French Text.

Luminous Flux.—Is the rate of passage of radiant energy evaluated by reference to the luminous sensation produced by it. Although luminous flux should be regarded, strictly, as the rate of passage of radiant energy as just defined, it can, nevertheless, be accepted as an entity for the purposes of practical photometry, since the velocity may be regarded as being constant under those conditions.

The Unit of Luminous Flux is the Lumen.—It is equal to the flux emitted in unit solid angle by a uniform point source of one international candle.

Illumination.—The illumination at a point of a surface is the density of the luminous flux at that point, or the quotient of the flux by the area of the surface when the latter is uniformly illuminated.

The Practical Unit of Illumination is the Lux.—It is the illumination of a surface one square metre in area, receiving a uniformly distributed flux of one lumen, or the illumination produced at the surface of a sphere having a radius of one metre by a uniform point source of one international candle situated at its centre.

In view of certain recognized usages, illumination may also be expressed in terms of the following units:

Taking the centimetre as the unit of length, the unit of illumination is the lumen per square centimetre; it is known as the "Phot." Taking the foot as the unit of length, the unit of illumi-

nation is the lumen per square foot; it is known as the "Foot-Candle."

1 foot-candle = 10·764 lux.
= 1·0764 milli-phot.

Luminous Intensity.—(*Candle power*). The luminous intensity (candle power) of a point source in any direction is the luminous flux per unit solid angle emitted by that source in that direction. (The flux emanating from a source whose dimensions are negligible in comparison with the distance from which it is observed, may be considered as coming from a point.)

The Unit of Luminous Intensity (*Candle Power*) is the International Candle, such as resulted from agreements effected between the three National Standardizing Laboratories of France, Great Britain, and the United States, in 1909.*

This unit has been maintained since then by means of incandescent electric lamps in these laboratories, which continue to be entrusted with its maintenance.

The National Illumination Committee of Great Britain (affiliated to the International Commission on Illumination) are constituted by the co-operation of the Illuminating Engineering Society, the Institution of Electrical Engineers, the Institution of Gas Engineers, and the National Physical Laboratory.

The following are the representatives nominated to serve on the Committee for 1923:

H. Buckley	F. W. Goodenough
W. J. A. Butterfield	Haydn T. Harrison
J. G. Clark	James Kerr
W. C. Clinton	J. T. MacGregor-Morris
Harold G. Colman	Clifford C. Paterson
Kenelm Edgcumbe	Sir Joseph E. Petavel
Leon Gaster	A. P. Trotter
Percy Good	J. W. T. Walsh

Robert Watson.

The Committee have made the following appointments:

Representatives of Great Britain on the Executive Committee of the International Commission on Illumination.—Messrs L. Gaster and Robert Watson.

Officers:

Chairman.—Mr. Kenelm Edgcumbe.

Vice-Chairmen.—Messrs. Clifford C. Paterson and Robert Watson.

Treasurer.—Mr. W. J. A. Butterfield, 66, Victoria Street, London, S.W. 1.

Secretary.—Mr. H. Buckley, National Physical Laboratory, Teddington, Middlesex.

* These Laboratories are: The Laboratoire Central d'Electricité in Paris; the National Physical Laboratory in Teddington; and the Bureau of Standards in Washington.

The "R.G." Gas Producer.

A new type of gas-producer recently introduced by the R.G. Syndicate is described and illustrated in the issue of "The Engineer" dated the 6th inst. It is designed in accordance with the patents of Mr. T. Roland Wallaston, of No. 26, Corporation Street, Manchester, whose aims have been to secure higher thermal efficiency, to obtain bye-products more efficiently, with a higher-value gas of good chemical constitution, and to extend the range of fuels available. The first plant has been in use for some time at a works in Preston, where the gas generated is being used for firing one of a battery of Lancashire boilers. This plant is not equipped with gear for the recovery of ammonia or tar products; but appliances are provided for testing the potential yields from the gas produced. Above the producer there is a retort of novel construction; the fuel being kept open and in constant movement while in contact with the hot outgoing producer gas. The retort is provided with shelves; and the fuel travels downwards from one to another, under control of slowly-moving spiral rakes, being finally dropped into the producer in the form of coke or semi-coke. The gas from the producer enters the retort at a temperature of about 600° C., and is cooled and enriched, both as regards thermal value and potential bye-products, before leaving the retort at the top. The producer itself is unlined, or only partially lined with refractory material, and is surrounded by a water space forming a boiler for steam-raising purposes. In this way is provided the whole of the steam required to drive the Roots blower, feed pump, coal elevator, revolving rakes in the retort, and corrugated crushing rolls beneath the fuel bed. These rolls slowly rotate inwardly, and enable the operator to draw ash at will from any segment of the producer. There is a Duff grate, and in addition a central hollow vertical cone, to the upper part of which the air blast is introduced. A water spray is also provided. A typical analysis of the gas showed total combustible constituents 45·3 p.ct.; the gross calorific value being 182·9 B.Th.U. The producer is operating on small coal and slack, and has worked well with fuels containing upwards of 40 p.ct. of ash.

Measurement of the Heating Value of Gas.—Prof. C. V. Boys, F.R.S., will lecture at the Royal Institution, Albemarle Street, W., on Friday, April 27, at 9 p.m., on "Measurement of the Heating Value of Gas."

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Waterford Gas-Works Strike.

Sir,—Would you kindly amend certain items of your news paragraph in yesterday's issue, which, if not corrected, might injure the Company?

The Union are endeavouring to force the Company to re-engage thirty men in excess of their requirements. The demarcation dispute between the two Unions is understood to be settled. The Company offered the men either to revert to twelve-hour shifts or else work eight-hour shifts with smaller gangs. Mr. Ellacott did not express the view that if the dispute did not end soon, liquidation would ensue, but that employing superfluous men would end in liquidation for any company.

There was not a working loss last year, as stated; but reserves had to be drawn upon to maintain the full statutory dividends, which have been paid for many years.

No. 5, Victoria Street, Westminster, S.W.,
April 12, 1923.

R. B. Anderson,
General Manager.

REGISTER OF PATENTS.

Coke Ovens.—No. 171,117.

Becker, J., of Pittsburg.

No. 29,644; Nov. 7, 1921. Convention date, Nov. 8, 1920.

The object of this invention is to increase the heating efficiency and control facilities of batteries of coking retort ovens having coking chambers arranged side by side, with intermediate heating walls and reversible regenerators.

The invention consists broadly in disposing the heating walls operatively in pairs, with the two heating walls mutually paired on the opposite sides of an intervening coking chamber, constituting a separately functioning unit for the reversible regenerative flow of the heating gases by mutually interconnecting the two opposite walls by ducts extending across the intervening coking chamber. In this way, all the gases produced by the combustion in the heating wall on one side of the chamber are drawn off through the heating wall on the other side. It is particularly applicable to coking retort ovens of the type in which the regenerators are disposed below, and parallel to, the coking chambers and heating walls.

The invention is further characterized by the vertical flame flues in each heating wall being disposed in groups, and by a connection conduit common to, and connecting over the adjoining coking chambers, the flues of each group in each heating wall and the flues of a corresponding group in an adjacent heating wall; the regenerators being arranged to provide for concurrent inflow to, and outflow from, alternate heating walls.

With this flue construction a pair of horizontal flues in each heating wall may be substituted for the usual single horizontal flue which extends from end to end of the heating wall. Each member of the pair need communicate with only approximately half the total number of flues of the heating wall, and consequently the dimensions of each flue may be considerably decreased. The above-stated reduction in size of the horizontal flues is claimed to be an important advantage, for the reason that it enables a considerable thickening and strengthening of the walls of the oven structure in the region of the horizontal flues. Moreover, the improved flue construction permits an increase in the height of the flame flues with a corresponding increase in the height of the coking chambers. Hence the latter may be made narrower in width—a development greatly facilitating the coking of high volatile coals, and yet having adequate provision for taking care of the increased volume of combustion products, without making it necessary to enlarge the horizontal flue dimensions to sizes inconsistent with adequate strength of the wall construction. The flue construction of the invention is furthermore of great importance in oven batteries fired with extraneously-derived gas, such as producer gas, since the employment of such gas results in an increased volume of combustion products, and adequate flue spaces must be provided to collect and feed to the downflow operating flues this increased volume.

According to the invention, the flue construction may be adequately accommodated to such increased volume without introducing elements of weakness into the wall structure.

A further feature of the invention consists in providing gastight supporting walls arranged parallel to the coking chambers, some of such supporting walls being located directly beneath the heating walls and the others directly beneath the coking chambers. This construction permits individual control of the flow through individual checkerwork chambers and flow under relatively different pressures or of different gaseous media in the checkerwork chambers of the regenerators. This results in a control of the flow through the flame flues of the heating walls, permitting flow in the same direction through all the flame flues of each heating wall, whereby all the flame flues are either simultaneously burning or simultaneously operating as downflow flues for carrying away the waste gases.

Utilization of Heat from Incandescent Coke. No. 187,567.

Sulzer Frères Stè. Anye., of Winterthur.

No. 2719; Jan. 30, 1922. Convention Date, Oct. 18, 1921.

This invention relates to the apparatus for utilizing the heat withdrawn from incandescent coke in a cooling plant, of the kind in which the heat is supplied to a steam generator by means of a gaseous heat

carrier caused to flow in a cycle through the incandescent coke in a cooling chamber and through the heating chamber of the steam generator. The object of this invention is to utilize the heat which the gases still contain after generating steam, and at the same time, by so using this heat, to cool the coke in a more efficient manner than formerly.

To this end, after the heat carrier has been led through one part of a steam generator in which it actually generates steam, it is caused to flow through a second part or chamber of the generator, where it imparts its remaining heat to the feed water. The feed-water container is so connected to the generator proper that the feed water receives no heat from the generator, and as a result more heat is withdrawn from the coke when the heat carrier passes through the cool feed-water chamber. In some cases, if desired, after leaving the feed-water heater, the heat carrier, after being passed through the steam generator and feed-water chambers, is conducted over the outer walls of the feed water and steam drums to prevent loss by radiation of heat therefrom.

Gas-Coppers.—No. 194,037.

Ewart, J. W., of Crouch End.

No. 34,857; Dec. 28, 1921.

The main object of this invention is to provide, in gas-coppers, an improved construction of outlet for the steam and combustion products. The copper comprises the usual copper vessel which is inserted within an outer casing fitted at the lower end with the heating burner, the products of which pass upwards in the usual manner between the copper vessel and the casing, and escape through an outlet pipe which extends into a flue pipe fitted to the top of the copper; the outlet pipe being of less diameter than the flue pipe but being connected to the latter at its upper end. There is thus a space between the outlet pipe and the flue, and this space is in communication with the copper vessel, so that the steam escaping from the latter enters this annular space, whence it can pass through a series of holes in the inner outlet pipe into the latter and thence into the flue, where it mixes with the gases of combustion.

To prevent any water of condensation from running down the flue pipe and re-entering the copper through the orifices in the outlet pipe, a lip or baffle-plate is attached externally to the latter adjacent to the orifices, so that any water of condensation passing through these holes is collected in the annular channel formed by the lip, and is subjected to re-vapourization.

In practice the top of the copper is advantageously made of sheet-metal, and is furnished with a down and interned rim or peripheral portion formed at points diametrically opposite to one another with a pair of holes designed to engage with rivets or pins projecting from the casing, and which, when the top is turned, lock or retain it in position on the outer casing.

Heating Range-Ovens by Gas.—No. 194,225.

West, G., and Millar, W. S., both of Dundee.

No. 18,605; June 30, 1922.

The object of this invention is to provide a device, having improved construction and arrangement of parts, by which an oven, ordinarily heated by coal, can be readily adapted to the use of gaseous fuel. The invention comprises a heater or burner fitted in the oven, and a vent located in the top of the oven communicating with the flue of the range with means for closing the same, the heater being provided with a connection disposed under the floor of the oven so that a supply tube may be passed through the soot-box door.

The heater is preferably made in the form of three sides of a square, though it may be made of any desired shape. The arms, perforated with holes for gas jets, are screwed into a T-piece. The vertical stem of the T is externally screw threaded; a thin nut being mounted on the stem for locking the device in position in the oven. Holes to admit air are formed in a long sleeve which is internally screw threaded. Portions of the stem are cut away to allow air to pass if the stem is screwed down to air inlets. An elbow piece has formed at one end a nipple which screws into the sleeve, the other end being shaped to accommodate the end of a flexible metal tube. In the top of the oven is cut a vent provided with a pivoted cover which is accessible through the flue door in the hotplate. The device is fixed in the oven by passing the stem through a hole in the bottom of the oven and tightening the nut. The end is adjusted by means of the long sleeve so as to be accessible through the soot hole.

When it is desired to heat the oven by gas, the cover is moved so as to open the vent to allow the products of combustion and odours from the cooking to pass up the flue, after which the flue door is replaced. The soot-box door beneath the oven is then removed, and a flexible metallic tube connected to any suitable source of gas supply is attached to the burner, the soot-box door remaining out of place during the time the oven is being heated by gas.

By means of this invention the oven door can be kept closed and the products of combustion can escape up the flue without the necessity of the oven door being kept open, which allows the oven to get cool and the odour of cooking to escape in the house. If oven shelves are used, they should be of an open nature, such as grids, in place of those usually employed.

Gas Washing and Scrubbing Apparatus.—No. 194,361.

Cockey and Sons, Ltd., of Frome, Hiller, H. K., of Victoria Street, S.W. 1, and Harrison, J. F., of Partick.

No. 32,494; Dec. 3, 1921.

This invention relates to apparatus for the washing and scrubbing of gases in order to free them from ammonia, carbon dioxide, sulphuretted hydrogen, and other soluble impurities, and seeks to provide for a satisfactory time-contact.

The accompanying sectional elevation (fig. 1) and plan (fig. 2) illustrate one convenient form of apparatus in accordance with the invention. Any number of superposed compartments or chambers A B are provided; in the lower part of each of which are radially disposed slots or gas openings C, each of which is surmounted by a hood D adapted to surround the slightly upstanding lip E on the slot and the lower edges of which are provided with serrations F, through which the gas finds an outlet after bubbling through the seal of liquid in which the hood stands.

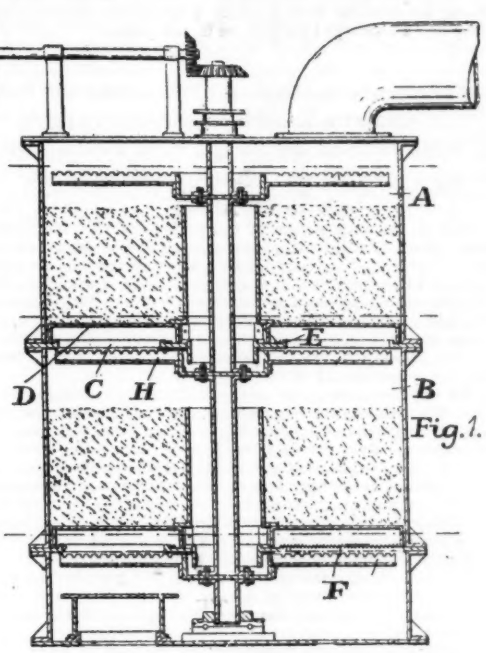


Fig. 1.

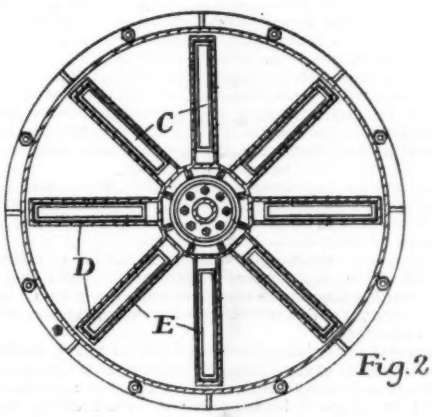


Fig. 2.

A Washer-Scrubber—Messrs. Cockey and Sons, Ltd.

The space in each compartment above the hoods is filled to any desired depth with porcelain rings or any other suitable filling material or substance over or through which the cleansing or purifying liquid may flow, and adapted to give the greatest possible contact surface between the liquid and gas, subject to the limits of the cubical capacity of the containing vessel.

For the purpose of providing for the most efficient distribution of the cleansing medium from one compartment to the next, in the upper part of each compartment, just below the gas inlets of the next higher compartment, a series of radial trough-like arms H are adapted to receive the liquid over a centrally disposed weir to which the liquid passes from the bubbling hoods of the upper compartment. These arms are either suitably perforated or arranged for an overflow of the liquid, and are adapted to be rotated by suitable means.

It will be obvious that one or more of the superposed compartments may be suitably isolated from the others so that various purifying liquids may be employed for cleansing the gases.

Gas-Burners.—No. 194,413.

Milne & Son, Ltd, of Neasden, N.W. 10, and Staniforth, H., of Harrow.

No. 33,512; Dec. 13, 1921.

The object of this invention is to provide for preventing burning-back in bunsen burners an improved device which is indestructible, and which at the same time is not liable to become stopped up, and offers a minimum hindrance to the passage of the gaseous mixture, so that a sufficient injection effect is produced to allow the burner to be used with low-pressure gas.

The device comprises a disc or diaphragm having a plurality of perforations which are of a diameter not less than half the thickness of the disc or diaphragm; the thickness of the disc being not less than

half the internal diameter of the most restricted part of the conduit through which the gaseous mixture passes.

The perforations are arranged near the edge of the disc, and in the centre of the disc there is an unperforated part of a diameter which is not less than the internal diameter of the most restricted part of the conduit through which the gaseous mixture passes, thereby distributing the gaseous mixture towards the edges of the surrounding conduit and providing a larger surface of contact without materially increasing the resistance to the free passage of the gaseous mixture.

When required for use in an incandescent burner, the edge of the disc may be provided with a conical edge which enables it to be fitted tightly into an enlarged part of the nozzle piece.

Improvements in Means for Measuring and Delivering Gas at a Known Rate.—No. 194,370.

The Board of Trade and Boys, C. V., of Victoria Street, S.W. 1.

No. 32,728; Dec. 6, 1921. Patent of Addition to No. 180,080 of Feb. 24, 1921.

Owing to the importance of the subject of this specification, the general description of the patent was published as an article in last week's "Journal" (p. 104); and to preserve the completeness of this "Register of Patents" we now give the claims of the patentees.

The invention relates to a modification of the Boys' recording gas calorimeter, and embodies an improvement in the apparatus for delivering the gas at a known rate, automatically correcting for the variations of temperature and pressure and water vapour content.

The patentees claim:

1. An improvement in, or modification of, the method according to Patent No. 180,080 of maintaining constant the volume of gas, if measured at standard temperature and pressure and saturated with water vapour, passed in unit time by a gas measuring and delivering device operating substantially at atmospheric pressure, notwithstanding possible deviation from predetermined conditions of barometric pressure and temperature, which consists in ensuring a state of water-vapour saturation as regards the gas within the gas-measuring element, driving from a constant time-governed source of uniform motion a member upon which a constant-volume measuring element is loosely mounted, and varying the rate of drive of said member to counteract the change in the volume of the gas due to changes in barometric pressure, temperature, and the consequent proportion of water vapour in the saturated gas.

2. The constant-volume gas-measuring element is mounted loosely upon an axle between which and a time-governed source of uniform motion is interposed an epicyclic gear which is controlled by an integrator operated in accordance with such deviation.

3 Improved or modified apparatus according to Patent No. 180,080 for measuring and delivering gas at a constant rate (if the gas were measured at standard temperature and pressure, and were saturated with water vapour), including a source of uniform motion, a meter drum loosely mounted upon a member driven by said source of motion, an epicyclic gearing between said source and said member, and an integrator co-acting with the epicyclic gearing.

4. Apparatus for measuring and delivering gas as claimed in Claim 3, wherein the epicyclic gearing is asymmetrical and gives a greater reduction to the motion received from the integrator than it gives to the motion received from the source of motion.

5. Apparatus as claimed in Claim 3 or Claim 4, incorporating a meter drum which embodies end discs, a plurality of radial partitions, a closed chamber (serving to render definite the capacity of the gas-measuring element and to incorporate buoyancy), and tubular gas inlet and outlet passages.

6. In apparatus as claimed in any of Claims 3 to 5, the inclusion of means for ascertaining accurately the water level in the meter, comprising a series of adjacently mounted upwardly pointed pins so supported that while some points lie beneath the surface of the water others break through the surface.

7. The combination with apparatus as claimed in any of Claims 3 to 6 of a saturator for the gas maintained at the same temperature as the meter for the purpose of avoiding, or greatly reducing, variation in the water level of the meter caused by evaporation or condensation.

8. Apparatus for measuring and delivering gas at a constant rate (if the gas were measured at standard temperature and pressure and were saturated with water vapour) as claimed in Claim 3 including in combination ball-disc-cylinder integrating mechanism, an air bell moving in accordance with the effect upon the volume of the gas of deviation of atmospheric conditions from the normal, and actuating means interconnecting the air bell and the ball of the integrating mechanism, and preferably including means for indicating the position occupied by the ball at any instant.

Coin-Freed Meters.—No. 194,434.

Glover, W. R., of Gothic Works, N. 18.

No. 34,244; Dec. 20, 1921.

This invention relates to that class of coin-freed mechanism in which the mechanism can be adjusted to receive different sizes of coins for delivering variable quantities of gas, and the object of the invention is to connect one of the worms by a sliding tube with the crown wheel to determine the position of the crown wheel relative to the coin receiver in order to suit various sizes of coins.

With this the patentee combines a pinion on one end of a worm meshing with a worm on a sleeve carried by a bracket, a pinion having teeth on its periphery and a ring of inturned or shrouded teeth on the sleeve, two pinions of different sizes mounted on the bracket, the smaller meshing with the external teeth on the sleeve pinion. A rod, capable of being moved end-on and passing through the sleeve, engages at one end the rod connecting the meter mechanism; the other end being provided with grooves and forming a hand-hold. A pinion on the rod is capable of meshing with the shrouded teeth on the sleeve pinion and with the larger pinion of the different sized pinions; and there are means on the bracket to engage either groove in the rod to keep the rod pinion in gear with the shrouded teeth or with the larger pinion.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 11.]

Nos. 9042 to 9609.

Ashworth, H.—"Method of producing a heated and energetic vapour or gas for power and heating." No. 9067.
Belton, C. M. D.—"Regulator and gas-burner." No. 9210.
Caswell, S. L.—"Drain pipes, gas-mains, &c." No. 9469.
Caudwell, F.—See Belton, C. M. D No. 9210.
Dougall, J.—"Coin-freed prepayment mechanism." No. 9354.
Letheren, T. W. & W. R.—"Geysers, &c." No. 9266.
Soc. Anon. de Construction de Fours à Coke Simplex.—"Gasifying coal, lignite, &c." No. 9505.
South Metropolitan Gas Company.—"Fuels containing carbonized products." No. 9506.
Tooth, L. F.—"Treatment of smoke and fumes." No. 9209.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Progress of Bills.

South Oxfordshire Water and Gas Bill: Read a second time, and committed.

Hoylake and West Kirby Gas and Water Bill: Reported, with amendments.

Public Utility Companies (Capital Issues) Act.

A copy was presented of a report on an application under the Act by the Godalming Gas and Coke Company to the Board of Trade.

Gas Regulation Act.

On the motion of Viscount Wolmer, a resolution was passed approving the draft of a Special Order proposed to be made by the Board of Trade under section 10 of the Act, on the application of the British Gas Light Company, with respect to their Norwich undertaking.

HOYLAKE AND WEST KIRBY GAS AND WATER BILL.

This Bill came before the Unopposed Committee of the House of Commons—presided over by the Rt. Hon. J. Fitzalan Hope, Chairman of Committees—on Tuesday of last week, and was ordered to be reported for third reading. Full details of the Bill were given in the "Journal" for Jan. 10; and the principal alterations are dealt with below.

Mr. R. H. Fox (Messrs. Torr, Durnford, & Co., Parliamentary Agents) said the Bill was promoted by the Hoylake and West Kirby Gas and Water Company, the principal object being to re-incorporate the Company, now a limited liability company working under ten Provisional Orders, a Temporary Increase of Charges Order, and a Capital Issues consent. The proposal was to re-incorporate the Company in the usual way, giving stocks for shares, converting on a 7 p.ct. basis. At the present time some of the shares of the Company were issued jointly on both the gas and the water undertakings, some were issued solely on the water, and some solely on the gas; and such confusion existed that the quotation of the shares had been withdrawn from the Liverpool Stock Exchange, which made it very difficult for the Company to get new capital. Therefore the Bill proposed to re-incorporate the Company with a common capital, and with power to allocate the proceeds of capital issues to both the gas and the water undertakings; the Company also having statutory gas and water charges. Originally there were four petitions against the Bill—by the two local authorities whose areas were served by the Company, by the County Council, and by the railway companies. The local authorities had been advised by Mr. Arthur Valon as regards gas and water matters, and by Mr. Arthur Collins as regards finance; and these two gentlemen had been in close touch with Messrs. Doig Gibb and Hawksley, who had been advising the Company with regard to gas and water respectively, as well as finance. An agreement had been reached, so that the Bill now came before the Committee as unopposed.

The Chairman said he understood the reason for the Bill was more a financial than a technical one. In other words, the capital was differently secured, and it was desired to have it all secured on the whole of the undertaking.

Mr. Fox said this was the main reason for the Bill. The Company were also asking for a therm price to be fixed by the Bill. In this way they would get all the new powers in one document, instead of making an application to the Board of Trade in regard to gas, to the Ministry of Health in regard to water, and possibly having to make an application to the Courts for the re-arrangement of capital.

Sir Ernest Moon, K.C. (Speaker's Counsel), said that, among other things, the Bill asked the Committee to determine what was a fair and reasonable sum which should be the standard price for gas; and the Board of Trade had suggested that the Committee should satisfy themselves that the price proposed was not in excess of the price which would be justified at the present time, if the price were fixed in accordance with section 1 of the Gas Regulation Act of 1920. Several cases had occurred in which the Unopposed Committee had been asked to determine standard prices for gas. The Committee had neither the materials nor the machinery which would enable them to come to a satisfactory conclusion upon an intricate matter of this

kind; and it had been the practice of the Committee in the past to ascertain whether there had been a real investigation, and not a sham one, into the price proposed—an investigation at the instance of the proper representatives of the consumers. If the Committee found there had been such an investigation, and that those who had held the investigation had been advised by competent people, they accepted the decision which had been agreed upon by the parties. If the Committee were not satisfied that there had been such a full investigation, they referred the matter to the Board of Trade to determine what the price should be. This was what the Committee would have to do in the present case; and the promoters would have to satisfy the Committee that there had been a proper investigation.

Mr. *W. Doig Gibb*, Consulting Gas Engineer, was then called in regard to the gas proposals in the Bill; and speaking upon the question of price, said that he had prepared a schedule as prescribed in section 1 of the Gas Regulation Act of 1920, after having gone into all the figures with the Secretary of the Company. As a result of that inquiry, he came to the conclusion, on the facts as they existed at the time the Bill was deposited, that a figure of 18·5d. per therm would be a fair one. After the petitions against the Bill were deposited, he got into touch with Mr. Valon, who was advising the local authorities. They had three meetings, and went through the whole of the schedule of figures which had been prepared in just the same way as would have been done had the matter been inquired into by the Board of Trade. The figures were argued one by one; and ultimately they agreed on a figure of 13·6d. per therm, this reduction having been possible owing to reductions in the cost of labour and materials since the figure put into the Bill originally—viz., 18·5d.—was arrived at.

The CHAIRMAN: That was a private conference between Mr. Valon and yourself?

Witness agreed, and added that there were three separate meetings lasting several hours. Having a knowledge of the prices to which the Board of Trade had agreed in similar cases, he felt he could say that the figure of 13·6d. per therm was a reasonable price; and it had been agreed between the promoters and the local authorities.

Mr. R. RICHARDSON (a member of the Committee, and Labour Member for Houghton-le-Spring) asked why the proposed standard price was so much higher than that at Sunderland.

Witness explained that the conditions of the Sunderland Company and the Hoylake and West Kirby Company were totally different. He had also been consulted by the Sunderland Company. In the first place, Sunderland was practically at the pit heads of the finest gas coal to be obtained in the country; and this meant a difference of from six to ten shillings per ton in freight costs alone. Again, the Sunderland Company were much larger, and could produce at a much lower price per therm than a small company like the Hoylake Company. Another factor was that the Sunderland capital had been very judiciously and consistently reduced through a number of years before the war; and this again gave them a great start over a small company which were only coming to Parliament for the first time to ask that their financial position should be put into proper order.

Mr. RICHARDSON suggested that the actual price of coal in the two cases would be roughly the same.

Witness again emphasized the fact that freight costs are all-important; and Hoylake was badly situated in this respect, as the coal had to come a roundabout way.

Mr. FOX said that Mr. Hawksley's firm were responsible for the construction of a great part of the Sunderland works; and Mr. Hawksley, who was present, could speak as to the special circumstances there which were now being reflected in the price of gas at Sunderland.

Witness said the price of 13·6d. was a comparatively low one for a works of the size. The population was only 20,000 to 22,000.

Consideration was then given to the water part of the Bill. During this, it was stated that both the gas and the water charges can be reviewed at any time; the provisions of the Gas Regulation Act in this respect having been embodied in the Bill.

Mr. FOX, dealing with the Board of Trade Report on the Bill, referred to clause 69, relating to pressure. Under the Gas Regulation Act, he said, as soon as a therm Order was granted, the prescribed pressure of two inches must be given to all parts of the area. In the Bill as deposited, it was proposed that in certain districts to the east of the area and of a rural character, the rule as to this pressure should not come into force for two years. Since then the Company had speeded-up the laying of new mains; and it was now possible to strike out of the Bill two of the districts to which this suspension was asked to be applied; and these districts were getting the two inches pressure to-day. In the third district, which was at the end of a main, it was now asked that the two inches pressure regulation should be suspended for six months after the passing of the Act. It was anticipated that this pressure would be given there by Christmas. In regard to clause 131: "Power to Directors to make donations, subscriptions, &c.," after the words "to any industrial exhibitions" had been added the words "relating to the objects of the Company."

The preamble of the Bill having been proved by Mr. *A. G. Readdy*, Secretary and General Manager of the Company, the Committee, as already stated, ordered the Bill to be reported for the third reading.

The capital proposals, as set forth in the original Bill and given at length in our issue for Jan. 10, have been accepted by the local authorities, and remain unaltered.

Unpaid Gas Accounts at Keighley.—At Keighley Police Court the week before last, there were 184 summonses for non-payment of gas bills. The amount owing in one case was as much as £14 6s. 8d.; while in another the sum was only a shilling. Two defendants objected to the high amounts, which they alleged were due to gas leakages. Short time and sickness were the general excuses; and various offers of payment by instalments were made. The Magistrates advised people who were burning more gas than they could afford, to get slot meters, so that they would be kept out of debt. Distress warrants were issued; but in the cases where definite promises to pay had been made, the Bench expressed the hope that the Corporation would delay execution of the warrants. The hope was also expressed that the Gas Department would get slot meters for the poor people.

MISCELLANEOUS NEWS.

LOCAL AUTHORITIES AND THE GAS REGULATION ACT.

Conference of Representatives of Municipal Gas Undertakings to Consider the Question of Applying for Orders under Section 1.

The following report has been circulated by the National Gas Council of Great Britain and Ireland of a conference of representatives of municipal gas undertakings, which was held at No. 30, Grosvenor Gardens, S.W., on Tuesday, March 27—under the Chairmanship of Alderman F. S. Phillips, J.P., of Salford—to consider the question of applying for Orders under Section 1 of the Gas Regulation Act, 1920.

Alderman PHILLIPS reported the proceedings at a deputation representing municipal gas undertakings—the members of which were Alderman Phillips, Mr. C. Wood, O.B.E., F.C.S. (Bradford), and Mr. A. W. Smith (Deputy for Alderman J. H. Lloyd, J.P., of Birmingham)—to Mr. H. C. Honey, Director of Gas Administration, Board of Trade, on March 21.

Alderman PHILLIPS asked Mr. Honey what would be the position of gas undertakings who were working under Orders granted under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, which expires on Aug. 31 next, where such undertakings would not be in a position to revert to the prices of gas as fixed by their Statutes. He also asked whether the Statutory Undertakings (Temporary Increase of Charges) Act could be extended to meet such cases.

Mr. HONEY definitely stated that there could be no extension of the Statutory Undertakings (Temporary Increase of Charges) Act. This could only be accomplished by legislation, and was quite out of the question. As regards the 25 or so gas undertakings which were at present working under the Statutory Undertakings (Temporary Increase of Charges) Act—which undertakings were not in a position to revert to the prices for gas fixed by their Statutes—the Board of Trade would have no difficulty in granting Orders under section 1 of the Gas Regulation Act if these undertakings applied within a reasonable time. The Board of Trade were most anxious to assist these particular undertakings, and recognized the necessity of their obtaining Orders at an early date.

Alderman PHILLIPS pointed out that the Gas Regulation Act did not offer any great inducement to local authorities, who were in many cases now working under perfectly satisfactory conditions, and whose consumers, who were the ratepayers, were adequately safeguarded. The change to the thermal system of charging would be of no practical advantage to the consumers; and, apart from this, many of the recommendations would be difficult to carry out.

Mr. A. W. SMITH (Birmingham) supported Alderman Phillips, and pointed out that the reason municipalities had refrained from voicing any protest during the course of the Gas Regulation Bill was because they felt that financial relief to gas companies was long overdue, and they did not wish to jeopardize their case. He stated that the contribution to the gas fund which was levied on those undertakings who had Orders under section 1 of the Gas Regulation Act was high, and of no apparent gain to the consumer. He asked whether the Board of Trade intended to apply compulsory Orders to municipal gas undertakings, and, if so, what form such Orders were likely to take—whether a general or omnibus form, or in the shape of an individual Order.

Mr. C. WOOD (Bradford) said that municipal gas undertakings in Yorkshire would prefer to remain outside the Act; but if the Board of Trade decided that municipal gas undertakings should apply for Orders, he hoped that the operation would be carried out in as easy a way as possible.

Alderman PHILLIPS said that under the Gas Regulation Act it would be necessary to expend a very large sum of money in many cases in order to increase the pressure in the mains or 2-in. service-pipes from the main to the meter. The Manchester Corporation Gas Department had a clause in their 1921 Act which read as follows:

> 37. (1) All gas supplied by the Corporation to any consumer of gas shall be supplied at such pressure as to balance a column of water not less than 2 in. in height at the main or as near as may be to the junction therewith of the service-pipe supplying the consumer.

The deputation wanted to advise municipal gas undertakings as to what course they should take.

Mr. HONEY stated that he did not think a general or omnibus Order could be made to apply to gas undertakings. He thought that any Orders which were made would have to relate to the particular undertaking. The maximum prices fixed under the Order would, in all probability, be in excess of the existing maximum prices prescribed in the Statutes of the undertaking; but the Board of Trade were bound to go into the question of prices in each case. With regard to gas undertakings which were able to keep within their statutory maximum prices, up to the present time there was certainly no idea in the mind of the Board of Trade to exercise compulsory powers. It was the last thing the Board of Trade wanted to do. The Board of Trade would very much prefer that municipal gas undertakings should come under the Act voluntarily. He was very anxious that the process of municipalities coming in under the Gas Regulation Act should not be too lengthy; but he could not pledge the Board of Trade to any distant policy. He thought, however, that he was quite safe in saying that no compulsory Order would be made upon any municipal gas undertaking prior to Aug. 31 next, because the Board of Trade would necessarily have to deal with these undertakings which could not carry on without relief, and whose Orders under the Statutory Undertakings (Temporary Increase of Charges) Act expired on this date. In cases where gas undertakings had no maximum price fixed under their Statutes, an Order under section 1 of the Gas Regulation Act would enable them to charge on a thermal basis. A large number of undertakings in Scotland had not got a maximum price. They were working under the Burghs Gas Supply (Scotland) Act, 1876. Under the provisions of this Act, the price of gas is fixed from time to time on an estimate

of the probable cost during the ensuing period. The undertakings obtain no profit, because the price is fixed at a figure which is as near the cost as they can get. In these cases an Order made under section 1 of the Gas Regulation Act would not deal with the price at all, but would simply authorize gas undertakings to supply gas on the thermal method of charging, and, of course, would bring into operation the testing provisions in the Act.

Alderman PHILLIPS then invited the representatives at the meeting to express their views, and said that he was sorry to report that Mr. Wood, of Bradford, was unavoidably prevented from being present. He then invited Mr. A. W. Smith, of Birmingham, who was the other member of the deputation, to speak.

Mr. A. W. SMITH stated that the general feeling after the deputation was that the Board of Trade did not want to apply compulsion to municipal gas undertakings if they could avoid it. He would strongly advise those undertakings who were now working under an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, and could not revert to the prices fixed by their Statutes, to make immediate application for an Order under section 1 of the Gas Regulation Act. He felt very strongly that those municipal gas undertakings who were working within the prices fixed by their Statutes should consider individually what steps they should take to apply for Orders under section 1 of the Gas Regulation Act, in view of local circumstances. He felt that it might be a good opportunity for those undertakings who wanted to vary their present calorific value to apply for Orders under section 1, and that undertakings would be more likely to receive sympathetic consideration from the Board of Trade if they were to apply for Orders voluntarily, rather than if they waited for the Board of Trade to make a compulsory Order.

Alderman J. H. LLOYD apologized for not attending the deputation personally, and explained that he was prevented from so doing by an important engagement. He felt that the matter was now simplified, the report of the Departmental Committee appointed by the Board of Trade to inquire into the system of charging for gas on a thermal basis having been published. It was clear, from the proceedings at the deputation to the Board of Trade, that gas undertakings working under Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, and who could not revert to their Statutory prices, would have to make application immediately to the Board of Trade for Orders under section 1 of the Gas Regulation Act, inasmuch as the Statutory Undertakings (Temporary Increase of Charges) Act expires on Aug. 31 next. For the remaining municipal gas undertakings, he felt that the local circumstances would have to be taken into account; and he was of the opinion that gradually all municipal gas undertakings would have to come within the Gas Regulation Act.

Mr. E. PARRY (Oldham) asked whether it would be possible to have a copy of the proceedings of the deputation to the Board of Trade.

It was pointed out that the deputation to the Board of Trade was quite an informal and confidential one, and that it would not be possible to give a full detailed report.

Mr. C. S. SHAPLEY (Leeds) suggested that a digest of the report should be circulated.

Mr. SMITH (Birmingham) thought a digest of the proceedings of the deputation to the Board of Trade, together with a few notes of the meeting taking place that day, might be circulated to all representatives of municipalities connected with the National Gas Council.

It was resolved: "That the digest and conclusions of the deputation to the Board of Trade, together with a report of the meeting held this day, be circulated to representatives of municipal gas undertakings who are members of the National Gas Council."

Mr. J. W. M'LUSKY (Glasgow) stated that a meeting had been held about a week ago in Scotland, and that the general view was that Scottish municipal gas undertakings would be wise to apply for Orders under section 1 of the Act. The great difficulty with Scottish gas undertakings was the standardized quality of gas. Now that conditions were more stable, he did not see any obstacle to making application.

Alderman PHILLIPS stated that Orders under section 1 of the Gas Regulation Act would only be granted to statutory gas undertakings, and that non-statutory undertakings would not be enabled to charge on the thermal basis unless they made application under secion 10 of the Gas Regulation Act, in order to become statutory undertakings.

Mr. R. WATSON (Doncaster) said that, with regard to the 25 or so undertakings who would have to apply to the Board of Trade for an Order under section 1 before Aug. 31 next, there should be some sort of co-ordination. He felt that if such undertakings met before they put in applications for individual Orders, they might be able to obtain better terms.

Mr. SHAPLEY agreed with Mr. Watson that it would be helpful to have a meeting of those undertakings which were now charging above the maximum price provided for in their Statutes; and he suggested that it would be more convenient if the meeting were held in Birmingham than in London.

ANOTHER SPEAKER pointed out that his undertaking was practically ready for making application to the Board of Trade; and it seemed to him that to suggest calling together 25 or so gas undertakings which were still working under Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, was to lose sight of the fact that it would be necessary to obtain Orders under the Gas Regulation Act by June 30 next; otherwise an additional reading of the meters would be necessitated.

Mr. A. J. HARRISON (Accrington) pointed out that the Board of Trade had sent a circular letter to gas undertakings warning them that the Statutory Undertakings (Temporary Increase of Charges) Act expires on Aug. 31 next, and asking when they intend to make application under section 1 of the Gas Regulation Act. From information obtained from other speakers, it appeared that the Board of Trade had sent this letter to undertakings who originally had Orders under the Statutory Undertakings (Temporary Increase of Charges) Act. Some of these undertakings were now working at, or below, the maximum prices for gas stipulated in their Statutes.

Alderman PHILLIPS pointed out that there was no question that all those undertakings working under Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, and who would not be able to work within the prices for gas provided by their Statutes before Aug. 31 next, would have to apply to the Board of Trade for an Order under section 1 at once. Other gas undertakings, including those who had Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, but who were now working within their statutory prices, were not, however, compelled to make application before Aug. 31 next; and it was a matter for individual consideration as to when they should apply to the Board of Trade.

Councillor C. B. GRIFFITHS, O.B.E. (Barry), said that his undertaking had decided to carry on without making application under section 1 of the Gas Regulation Act; and he asked what the position would be if they were to neglect to apply for an Order.

Alderman PHILLIPS said that it was impossible to answer this question; but he recommended that the attention of the Barry Gas Committee should be drawn to the recommendations in the report of the Departmental Committee appointed to consider the question of charging for gas on a thermal basis.

Mr. A. J. HARRISON suggested that gas undertakings applying for Orders under section 1 might endeavour to adopt the Manchester clause as regards pressure.

Councillor GRIFFITHS asked whether the meeting would recommend gas undertakings to keep out of the Gas Regulation Act, or whether it would be better to make voluntary application for Orders.

Alderman J. H. LLOYD said that, in his opinion, this was a matter which should be left for each undertaking to decide for itself, having in view its particular circumstances.

Mr. F. BETLEY (Wigan) expressed appreciation of the services which Alderman Phillips had rendered to municipal gas undertakings. He stated that his undertaking had not received notice from the Board of Trade, although working under the Statutory Undertakings (Temporary Increase of Charges) Act; and they had now decided to apply for an Order under section 1 within the next day or so. He was glad to note what had been said at the meeting, that they were likely to receive sympathetic consideration from the Board of Trade.

Alderman PHILLIPS said he quite agreed that it would be simply losing time to call a meeting of the 25 or so gas undertakings who were working under Orders under the Statutory Undertakings (Temporary Increase of Charges) Act. The Deputation had got the assurance from Mr. Honey that the Statutory Undertakings (Temporary Increase of Charges) Act could not be extended beyond Aug. 31 next, and that if such undertakings made application to the Board of Trade for Orders under section 1 of the Gas Regulation Act, the Board of Trade would see that they got the Orders at the earliest possible date. He said that it seemed perfectly clear to him that those gas undertakings who were working within their statutory maximum prices must determine for themselves whether there was anything to be gained by standing out from the Gas Regulation Act—especially in view of the report now issued by the Board of Trade as to the inquiry on the thermal system of charge for gas. No resolution passed at the meeting that day would bind any particular undertaking; and the question must be decided by each individual concern. He did not think the question could be carried any further.

It was decided that it would be advisable to notify all gas companies that they must now consider and determine for themselves whether they would make application to the Board of Trade for an Order under section 1 of the Gas Regulation Act, and, if so, at what date.

GAS REGULATION ACT ORDERS.

The Director of Gas Administration has forwarded copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Fareham Gas and Coke Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 16·6d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half. (April 11.)

Horsham Gas Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 17d. per therm; and this price shall be substituted for the price of 4s. 7d. per 1000 c.ft. wherever it is mentioned in section 8 (price of gas) of the Horsham Gas Order, 1901.

After the declared date, the word "therm" shall be substituted for "1000 c.ft.," and the words "fifth of a penny" shall be substituted for the word "penny" wherever it occurs in paragraph (ii.) of Schedule B to the Horsham Gas Order, 1901. (April 13.)

GAS PROFITS AND THE RATES AT STAFFORD.

The Gas Committee of Stafford reported to a meeting of the Town Council last week that it was estimated that, out of the revenue of the Gas Department for the year ended March 31, there would be a sum of £2000 available towards the general district rate.

Alderman BEDFORD said the deplorable thing about the estimates was the fact that the 4d. reduction, made possible by the profit on the gas, had gone to reduce the district rate, while the poor or borough rate had not been relieved at all.

Mr. OWEN urged that the profit on gas should not be used to reduce the rate. The price of gas should be reduced to the consumer.

Alderman MYCOCK remarked that the average price of gas throughout the country was 4s. 5⅝d. per 1000 c.ft., while the charge in Stafford was 4s. 0½d.

The report was adopted.

It has been ascertained that a recent fire which did considerable damage at Ings Mill, Guisely, was caused by the fusing of an electric wire in the top storey, thereby igniting the lattice box casing.

METROPOLITAN GAS COMPANY OF MELBOURNE.

The Half-Yearly Meeting was held at the offices of the Company, Flinders Street, Melbourne, on Jan. 26—Sir John M. Higgins (Vice-Chairman of Directors) presiding.

Mr. John Hinde (Manager and Secretary) read the advertisement convening the meeting. The Directors' report and balance-sheet for the half-year ended Dec. 31, 1922, were taken as read.

The Chairman said that the total quantity of gas sold for the twelve months ended Dec. 31 was 3808 million c.ft. This showed an increase of 10·3 p.ct. over the figures for the previous year. A good recovery had been made in the business done by the stove department; the number of cooking-stoves sold during the period being 7683. The number of gas-fires sold during the year showed a decrease of 15, as compared with 1921; but bath-heaters showed an increase of 126, and wash-coppers an increase of 91. In this department sustained efforts were being made to bring gas appliances under the notice of architects and builders; and special attention was directed to securing business from the new buildings along lines of new mains. Weekly cooking demonstrations had been continued, and a series of special suburban demonstrations had been held in conjunction with canvassing drives simultaneously conducted. The results had been highly satisfactory, and had proved the efficiency of this method of pushing the sale of gas appliances. In connection with the half-yearly figures for the period ended Dec. 31, 1922, the total revenue from sales of gas was £607,815, as compared with £602,236 for the corresponding period of 1921; and the disposal of residual products had realized a total revenue of £147,406, as compared with £144,279 for the December half of 1921. The return from coke sold showed a slight decrease; but this comparative reduction was more than balanced by an increase in revenue from tar and from sulphate of ammonia, which made a net increased revenue from residuals of £3100. The overseas market for sulphate of ammonia had improved, and showed a tendency to return higher prices. The quantity of coal carbonized for the half-year had been 161,012, as compared with 154,024 tons—an increase of nearly 7000 tons; but, notwithstanding this fact, the cost of coal had been £2000 less—a result largely brought about by the reduction of 2s. in freights, which had taken effect on April 18 last.

The erection of two important additional plants, said the Chairman, was being undertaken by the Company's construction department—namely, a gasholder at the Fitzroy works, which was being reconstructed and greatly enlarged, and a new carbonizing unit on the Woodall-Duckham vertical system at the West Melbourne works. The gasholder, when completed, would have a capacity of 2¾ million c.ft., and was contained in a tank which had been increased in depth by the addition of a reinforced concrete tank extension wall. The holder was expected to be ready for use by next winter. The new carbonizing unit at West Melbourne would be the fourth Woodall-Duckham continuous vertical plant of a nominal capacity of 2,000,000 c.ft. per diem erected at this works. Having regard to the necessity of providing for future requirements, foundations for two more carbonizing plants had been arranged for at West Melbourne; and tenders were being called for the supply and erection of a further retort-house at the South Melbourne works. Shareholders would be gratified to learn that in actual practice the Woodall-Duckham continuous vertical retorts were giving satisfaction. The carbonizing efficiency, output of gas per ton of coal, and quantity and quality of bye-products were equal to the estimates of the Company's Technical Adviser. During the half-year nearly 12½ miles of mains, including 1¾ miles of trunk mains, and 51½ miles of new services had been laid. The Directors had been enabled to reduce the price of gas as from last December's readings by a further 4d. per 1000 c.ft., making in all a reduction during 1922 of 8d. per 1000 c.ft. The present price of gas was 6s. per thousand. As would be noted, an amount of £32,000 had been appropriated to reserve fund, bringing this fund to £35,557—a figure far below the amount which should be carried by a company conducting a business of such magnitude and operating with a capital of over £3,000,000. Mention had been made at the last half-yearly meeting of the serious view taken of possible damage to the Company's mains and services through electrolytic action. Extensive investigations and research work had been conducted by the Company's officers, in conjunction with professional expert assistance, to determine, if possible, the extent to which pipes were being affected. Undoubted evidence of the existence of these stray currents had been discovered; and further strong representations had been made to the controlling authorities, urging that immediate steps should be taken to prevent, or at least minimize, the danger arising therefrom. The matter was of grave moment by reason of the fact that leakages from gas-mains would be at the inception difficult to trace, and would probably involve a heavy financial loss and inconvenience to consumers.

Before concluding the address, he wished to express appreciation of the able and satisfactory manner in which their responsible officers—Mr. John Hinde (Manager and Secretary) and Mr. J. N. Reeson (Engineer-in-Chief and Technical Adviser) had performed their difficult and onerous duties, ably supported by their assistant officers and staff, and by the general body of employees.

The motion for the adoption of the report and balance-sheet was then put to the meeting and carried.

Mr. George Bell moved, and Mr. Thos. H. Woodroffe seconded: "That a dividend of 6s. 6d. per share be declared out of the profits for the half-year."

The motion was carried unanimously.

Uxbridge Gas Capital Over-Subscribed.—Tenders sent in to Messrs. A. & W. Richards for the £60,000 of new capital in the Uxbridge, Wycombe, and District Gas Company reached the large total of £164,070. Those for the 4½ p.ct. debenture stock ranged from £95 down to the minimum of £85; for the 5½ p.ct. preference stock, from £105 down to the minimum of par; and for the ordinary stock, from £100½ down to the minimum of £95. The lowest prices to secure allotment were for the debenture, £86 10s. per £100; for the preference, £101 5s. 6d. per £100; and for the ordinary, £97 per £100.

BRIDGWATER GAS COMPANY.

The Annual Meeting of the Bridgwater Gas Light Company was held on April 3, Mr. R. Y. Foley being in the chair.

The Chairman said that the year would stand out as one of the best in their record. The troubles from labour had been for the most part stilled; and gasworkers generally appeared to appreciate how favourable their assured position was when compared with other less fortunate industries. Their employees fully appreciated the advantages of steady and constant employment; and their goodwill was reflected in the success of their joint livelihood. The Chairman drew attention to the saving in the cost of coal of nearly £5000, which, however, was largely offset by a decrease of £3100 in the receipts from residuals. In the case of sulphate of ammonia, £10 to £11 per ton more was obtainable for export than the home price, which was designedly kept at a very reasonable figure for the benefit of British agriculture. The Chairman then referred to a contract which had been entered into for the erection of a new gasholder, which would have a capacity of 250,000 c.ft. This work, though not immediately urgent, had been entered into in response to a Government appeal to corporations to expedite any work which was contemplated, and by so doing help to reduce unemployment. The Directors felt that in view of this appeal, and the fact that an opportunity had presented itself of obtaining a holder on very favourable terms, they were justified in proceeding with the work. During the year the Company had laid about 2000 yds. of high-pressure main, and installed at the works a pressure-raising plant capable of dealing with 20,000 c.ft. of gas per hour, and raising the pressure to 5 lbs. per sq. in. The Chairman next congratulated the stockholders on the return to at least par value of their holdings in the Company. At a recent sale by auction in the town a price was obtained for the Company's stock substantially above par. The Chairman, in moving the re-election of Mr. J. H. Cornish (Engineer, Manager, and Secretary), considered that the balance-sheet submitted was sufficient certificate of the value of Mr. Cornish's services. During the year the important works before referred to had been successfully carried through, and he was now engaged on the erection of the new gasholder.

Mr. Cornish returned thanks, undertaking to convey to the staff the good opinions expressed.

Interim dividends were paid on Oct. 1, 1922, of 6 p.ct. on the "A" stock and 3 p.ct on the "B" and "C" stocks. Further dividends were recommended of 8 p.ct. on the "A" stock and 4 p.ct. on the "B" and "C" stocks. The present price of gas is 1s. per therm.

TRADE NOTES.

The Duplex Mono Recorder.

We learn from Messrs. James Gordon and Co., Ltd., Windsor House, Kingsway, London, W.C. 2, that they have recently acquired the licence for the manufacture and sale in Great Britain of the "Duplex Mono Recorder," the flue-gas analysis apparatus, which automatically records on one chart both carbon dioxide and combustible gases. A pamphlet dealing with the apparatus is in course of preparation.

Dorman Wave Power Tools.

We learn from Messrs. W. H. Dorman and Co., Ltd., of Stafford, that arrangements are being made to give practical demonstrations of the Dorman Wave Power Tools at the following exhibitions: The Sixth International Mining Exhibition, to be held at the Agricultural Hall, from June 1 to 14; the Engineering, Shipping, and Machinery Exhibition, Olympia, from Aug. 31 to Sept 22; and the Public Works, Road, and Transport Exhibition, Agricultural Hall, Nov. 22 to 29.

Keith-Blackman "Challenge" Boilers.

An attractively prepared folder is to hand from the James Keith and Blackman Company, Ltd., of No. 27, Farringdon Avenue, E.C., relating to their new "Challenge" boiler—a compact, highly efficient sectional boiler, specially suitable for situations where large volumes of hot water are required, and where space is an important consideration. At present it is made in combinations of one, two, three, and four gas-fired sections, each section having a capacity of approximately 40 gallons per hour raised to 140° Fahr., and consuming about 100 c.ft. of gas per hour (declared value 500 B.Th.U.). The construction is simple, and the thermostatic control close and reliable.

Aluminium Facts and Figures.

This is the title of a pocket-book which has been forwarded to us by the British Aluminium Company, Ltd., 109, Queen Victoria Street, London, E.C. 4. The chief uses of aluminium and the methods of working it are treated separately in other publications issued by the Company. It has, however, been found desirable to collect all the chief tables into one comprehensive pocket-book; and this present edition is the fourth of its series. The tables have been revised to keep pace with the progress which has been made; and fresh matter has been added. It is pointed out that the uses of aluminium in the form of sheet cannot be covered in a short review. In a vast number of cases the lightness of the metal and the simplicity of working and polishing it make it cheaper than any other. In other cases it is used because of its remarkable resistance to corrosion; and, above all, in many applications the importance of weight reduction makes the use of aluminium almost essential. The book is saturated with useful information. It may be mentioned that the Company have published a booklet on the uses of aluminium in the gas industry.

Fall on Gas-Ring.—On April 10, the inquest was held on the body of a tobacconist named Sidney Ray, of Chiswick. It was stated that after closing his shop he remained to repair a wireless set. He was found later in the evening with his head on a gas-ring. A doctor stated that the condition of Ray's heart pointed to the conclusion that he had experienced an attack of giddiness, and had fallen on the stove, thereby turning-on the tap.

THE NORTH-EAST COAST COAL TRADE.

From Our Own Correspondent.

There has again been considerable congestion at the landing places, which have not yet entirely recovered from the Easter accumulation of boats. Collieries are, therefore, keeping themselves very fully stemmed, as they dare not depend upon bare quantities of tonnage, which may not get berthed when expected, and so stop the pits. The latter rarely have any storage facilities, but work direct into railway trucks. This is naturally much cheaper than putting coal on the ground and picking it up again, besides being less hard on the coal.

As a result of the fully stemmed, and in some cases rather oversold, condition of the collieries, they are keeping shippers down very closely to contract quantities. The latter experience considerable difficulty in picking up odd spot lots to complete cargoes, and have to pay full current prices.

Bookings are still brisk up to the end of June for any available lots of any sort. The chief demand is still for coking, and 35s. to 37s. 6d. is paid for good qualities. Steam coals for bunkers have also been in good demand, and 35s. is about the current rate for best sorts. Not so much has been heard of gas coal; but collieries are sufficiently well placed in respect of this also to be firm for this half-year.

Beyond the end of June there is not a great deal of new business in evidence. Collieries which are quoting 35s. now are inclined to offer at 30s. to 32s. 6d. for July-December; but even at these prices buyers are rather holding-off. It remains to be seen whether there is any development later in the Ruhr situation. If not, it would seem there is bound to be a scramble presently, which would put the market back to its present rate; so that collieries are not at all anxious to make any further concessions just now.

Current quotations for gas coal may be called 35s. for specials and best qualities (Holmside, Boldon, New Pelton class), and 32s. 6d. for seconds. These prices are purely nominal, and very limited supplies are obtainable.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

The heavy demand for coal for export continues to be the principal feature of the trade both in Yorkshire and Lancashire. There are reports of American furnace coke being shipped to the Continent; and if this movement develops, the position of the fuel trade in Great Britain will doubtless be affected. The price for Lancashire coke at the ovens is 28s. per ton. Slacks are in good demand there at 14s. to 16s., and burgy at 19s. 6d. to 20s. 6d. per ton at the pits. The Lancashire house coal trade is quiet and unchanged.

In Yorkshire the demand of the inland market has greatly increased, principally in respect of industrial fuel. The shipping congestion at Hull has caused collieries to be inconvenienced by the lack of wagons. On Thursday there were 24 vessels loading at Hull, five at Grimsby, and nine at Immingham; 38 waiting for berths at Hull and 43 at Immingham; while 44 vessels were due to the Humber for coal cargoes. The export on Wednesday was 26,580 tons from Hull, 4000 tons from Grimsby, and 16,500 tons from Immingham; a total of 47,080 tons. On Tuesday the port export was 39,275 tons. Prices at the week-end were: Best South Yorkshire hards, 33s. 6d.; West Yorkshire Hartleys, 31s.; South Yorkshire washed doubles and singles, 32s. 6d. to 33s.; rough slack, 23s.; washed smalls, 25s. 6d.; unwashed doubles, 28s.; smalls, 20s. to 20s. 6d.; furnace coke, 52s. 6d. There has been a more lively inquiry in respect of the better-class house coal; and the secondary qualities, while not in urgent demand, were moving freely for shipment. Collieries generally reported that they had no stocks of any description. The supplies of good coking slacks are inadequate with the continued active demand for furnace coke.

COAL TRADE IN THE MIDLANDS.

From a Local Correspondent.

The gas coal market is showing unmistakable signs of strength. There is not very much business passing; but such transactions as are concluded are subject to an advance. Some Yorkshire collieries are asking 2s. to 2s. 6d. above current contract prices for renewals at midsummer; but buyers are not at all likely to acquiesce in these terms. In special cases additional supplies have been arranged over the present quarter at about 1s. above the amount payable on unexpired contracts. Gas undertakings in this district are not taking any steps yet with regard to new contracts. It is reported that some precautionary purchases have been made elsewhere for delivery after midsummer, and in such instances 1s. to 1s. 6d. more than the prices of last June has been conceded.

Very little has been done to overtake the arrears into which deliveries fell during the Easter holidays. Representations made to collieries on this head have not proved very productive. The backwardness of deliveries is not due, as far as appears, to transport delays, nor can it be attributed to the diversion of coal to the overseas trade, for the evidence points to a slight relaxation of the pressure for export. The cause is to be found in the pits.

In this district there is no indication of the deficiency of coke being redressed. Supplies are as short and prices are as firm as they were before Easter. Replying to the Wolverhampton Chamber of Commerce, who called attention to the injury done to the iron and steel industries by the withdrawal of coke for export, the Mines Department of the Board of Trade express confidence that the situation is being righted, thanks to the conferences in various parts of the country between the pig iron and the coke interests. The exports, it is added, are on no higher scale than in the last quarter of 1922.

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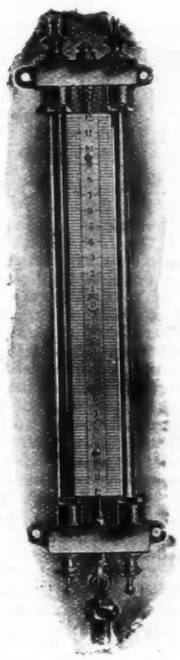

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *April* 16.

The market for tar products is quiet; but there is no easing in prices generally. Pitch is steady at about 190s. per ton, f.o.b. makers' works; creosote being from 10¼d. to 10½d. per gallon. Pure benzole is about 1s. 9d. per gallon; pure toluole from 2s. to 2s. 3d. per gallon, and 95/160 solvent naphtha 2s. per gallon. Other products remain unchanged.

Tar Products in the Provinces.

April 16.

The average values for gas-works products during last week were: Gas-works coal tar, 115s. to 120s. Pitch, East Coast, 185s. to 190s. f.o.b. West Coast—Manchester, 177s. 6d. to 182s. 6d.; Liverpool, 178s. 6d. to 183s. 6d.; Clyde, 180s. to 185s. Benzole 90 p.ct., North, 1s. 6d. to 1s. 6½d.; crude 65 p.ct. at 120° C., 1s. to 1s. 0½d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 8½d. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 1s. 6d. to 1s. 8d. Creosote, in bulk, North, liquid, 8¼d. to 8¾d.; salty, 7¼d. to 8d. Scotland, 7d. to 7½d. Heavy oils, in bulk, North, 7d. to 7¼d. Carbolic acid, 60 p.ct., 4s. to 4s. 2d. prompt, 3s. 10d. to 4s. forward. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Manchester District Tar Prices.

The average price realized for the sale of tar in the Manchester district, according to the sliding-scale, for the month of March, was £6 4s. 10·44d. per ton.

Horncastle's Dismal Prospect.

The old Lincolnshire market town of Horncastle is faced with the unwelcome prospect of being without a gas supply next winter, unless steps are speedily taken to remedy present deficiencies. The existing plant is of an entirely obsolete character, entailing unnecessarily heavy cost in working; and the Urban Council have, it is estimated, been losing on an average £1000 a year upon the undertaking. There is an overdraft of £3000 at the bank; and the Council still have four more yearly payments of £800 each to make in order to liquidate the loan on the appliances now in use. As a way out of the financial dilemma, it has been proposed to instal new plant at a cost of £2500 on the hire-purchase system; but the Clerk reported, at the last meeting of the Council, that he had interviewed officials at the Ministry of Health, who had absolutely refused to sanction the acquisition of new plant upon this basis, and had intimated that they would do all in their power to stop it. The Council's borrowing powers had expired; but the Ministry had indicated that they would help them to get a Bill through Parliament, and would sanction the Council's borrowing £10,000 to pay off the debt and overdraft, but would have first to be satisfied regarding the character of the new plant, for which purpose an inquiry would be held. The Clerk pointed out that the necessity existed for the immediate installation of new plant; but he recognized that if they proceeded to do that they would have to run the risk of the Ministry not approving it. If approval was not forthcoming, the loan would not be granted, and then they would be faced with the difficulty of having a new plant and no money with which to pay for it. The Chairman (Mr. W. O. Chapman) said they must go on with the scheme or close down. It appeared to him that whenever they endeavoured to do anything for the good of the town, the Ministry tried to stop them. The question resolved itself into whether they should defy the Ministry, or wait and obtain approval. They would certainly be without light next winter if they did not get on with the scheme. The Council determined to instal the plant at once, and to apply to the Ministry for a Bill for borrowing powers.

Reduction in Price at Lincoln.—The price of gas at Lincoln as from April 1 has been reduced from 4s. to 3s. 3d. per 1000 c.ft. for ordinary consumers, and from 4s. 5d. to 3s. 6d. for slot consumers.

City Meter Rents and Gas Charges.—At last Thursday's meeting of the Court of Common Council of the City Corporation, the Streets Committee reported that, consequent upon the withdrawal as from September 30 last by the Gas Light and Coke Company of the "no rents for meters" concession to City consumers, they had communicated with the Company, who were prepared to make the new meter rent charges as from Jan. 1, 1923, instead of Oct. 1, 1922, as originally contemplated. The Committee recommended, and the Court approved, that the 70 p.ct. increase over pre-war rates already agreed with the Gas Light and Coke Company in regard to their public lighting contracts be reduced proportionately by 10 p.ct. for each penny or part of a penny reduction in the price per therm from 11d.

Otley Gas Company.—The profits of the Company for the year 1922 amounted to £5548, and, with the balance brought forward, made the sum of £10,324. Out of this, interest and an interim dividend were paid, leaving a balance of £8634. It was decided at the annual meeting to pay a dividend at the rate of 7 p.ct. for the half-year on the ordinary stock (less tax), which, with the interim dividend, made 6 p.ct. for the year. This would leave a balance of £6816 to carry forward. The Directors have made application to the Board of Trade under the Public Utility Companies (Capital Issues) Act, 1920, for leave to issue 6 p.ct. redeemable preference stock to the amount of about £9000, in order to meet the additional capital expenditure which has for several years past been necessitated for the purchase of further plant and the extension of mains.

STOCK MARKET REPORT.

The Stock Exchange has had a rather remarkable week. After some mixed movements came a fine recovery in gilt-edged which set a strong tone generally. In Home Governments, Indian and Colonial issues, and Home Rails, persistent buyers carried prices by progressive advances to record figures. Canadians improved; but Argentine were dull. The Foreign Market was variable; but Russians and Turks were dull. Business in the Gas Market showed an improvement in point of volume, coupled with great firmness generally and a long array of advanced values in particular. In Londons, South Metropolitan and ditto debenture rose 1 each, and both Commercials rose 4. In Suburban and Provincials, Alliance and Dublin rose 2, Bournemouth preference 1, Brentford "A" 6, ditto "B" 3, Brighton ordinary 7, and ditto "A" 8, the three Sheffields 1½ each, Southampton 1, Swansea preference ½, and ditto debenture 1, Tottenham "A" 14, and ditto "B" 2. Abroad, Monte Video rose 2. Imperial Continental were unchanged; the market making no account of the postponed meeting.

The following transactions in gas during the week were recorded: On Monday, Aldershot 4 p.ct. pref. 69½, 70½, Alliance and Dublin 58⅜, Bombay 97s. 6d., Continental Union 26, Gas Light ordinary 98, 98¼, 98½, 98⅜, 99, ditto 4 p.ct. preference 79½, ditto 3 p.ct. deb. 62, 62½, 63, Imperial Continental 168, Liverpool 7 p.ct. pref. 104, Maidstone 110⅜, Monte Video 56, Primitiva 10s., 11s., ditto 5 p.ct. pref. 40s., San Paulo 6 p.ct. pref. 5⅜, South Metropolitan 98½, 98⅝, 99, 99½, Tottenham "B" 101½, 103, Tuscan 2s. 6d., Wandsworth new 102½, ditto 5 p.ct. pref. 99, Colonial Association 16s. On Tuesday, Bournemouth "B" 11 9/16, ditto 6 p.ct. pref. 9⅜, Brentford "A" 97½, ditto 5 p.ct. pref. 86½, British 4o, Cape Town 4½ p.ct. debenture 74¼, Croydon sliding-scale 101⅞, 102⅛, ditto max. div. 83, 83¼, Gas Light ordinary 98, 98⅛, 98¼, 98⅜, 98½, 98⅞, ditto 3½ p.ct. maximum 66, 66⅞, ditto 4 p.ct. preference 78½, 79, 79⅛, ditto 3 p.ct. debenture 62½, 63, Imperial Continental 166, 166½, 167, 167½, 168, 168⅜, ditto 3½ p.ct. debenture 77, South Metropolitan 97½, 98, 98⅛, 99, ditto 6½ p.ct. debenture 106⅜. Swansea 7 p.ct. preference 103½, Tottenham "B" 102⅝, 102⅞, Wandsworth 5 p.ct. 99. On Wednesday, Bournemouth "B" 11⅞, Brentford "A" 98¼, 101, 101⅛, 101⅜, ditto "B" 101, 101½, Commercial 4 p.ct. 97½, Continental Union 29½, European 8½, Gas Light ordinary 97⅞, 98, 98⅜, 98½, 98¾, ditto 3 p.ct. debenture 62, Imperial Continental 167, 167½, Primitiva 9s. 6d., ditto 5 p.ct. preference 38s. 6d., 39s., 39s 6d., 40s., South Metropolitan 98½. 99, ditto 3 p.ct. debenture 62, ditto 6½ p.ct. debenture 106, 106⅜, ditto 5 p.ct. debenture 106, 106¾, Wandsworth 5 p.ct. preference 98¾, Exeter 10 p.ct. 160, Colonial 7 p.ct preference 16s. 6d. On Thursday, Bournemouth 6 p.ct. preference 10⅜, Brentford "A" 103, ditto 5 p.ct. preference 90, Gas Light ordinary 97⅜, 97⅞, 98, 98⅜, 98½, 98⅝, ditto 4 p.ct. preference 79⅜, 80, Imperial Continental 167, Primitiva 10s., 11s. 6d., ditto 5 p.ct. preference 37s. 6d., 40s., South Metropolitan 98¼, 98½, ditto 6½ p.ct. debenture 107, Swansea 7 p.ct. preference 103½. Tynemouth 91. On Friday, Cape Town 4½ p.ct. debenture 74¼, Commercial 3 p.ct. debenture 58, European 8½, Gas Light ordinary 98, 98⅜, 98½, 98⅝, ditto 3½ p.ct. maximum 66, ditto 3 p.ct. debenture 62, Imperial Continental 166, 167, 168, Primitiva 10s., ditto 5 p.ct. preference 40s. 6d., South Metropolitan 98¼, 98½, 99, 99¼, Swansea 7 p.ct. preference 104, Tuscan 2s. 6d., Wandsworth new 102, 102½.

In the Money Market, the week opened with a rather pronounced demand; but the dominant factors soon subsided, and thenceforward absolute ease ruled. Discount was steady mostly. Silver fell. The Bank of England rate was 3 p.c., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
131,978	Stk.	Feb. 22	—	5%	Aldershot 5 p.c. max. C.	..	74—79	...
190,492	,,	,,	4	4%	Do. 4 p.c. Pref.	..	68—73	69½—70½
1,551,868	,,	Apl. 5	2½	5%	Alliance & Dublin Ord.	59—64	59—62*	58⅜
374,000	,,	Jan. 11	4	4%	Do. 4 p.c. Deb.	76—79	60—65	...
280,000	5	Oct. 19	7½	4/-	Bombay, Ltd.	5⅛—6⅛	4⅛—5	97/6
100,000	5	Feb. 22	16	8/-	Bournemouth Gas and Water { 5 p.c.	..	11—12	...
383,110	10	,,	7	7/-	Bournemouth Gas and Water { B 7 p.c.	15—15½	11—12	11 9/16—11⅞
115,000	10	,,	6	6/-	Bournemouth Gas and Water { Pref. 6 p.c.	13½—14	10—11	9⅛—10⅛
162,065	—	Dec. 29	—	4%	Bournemouth Gas and Water { 4 p.c. Deb.	..	71—76	...
992,045	Stk.	Feb. 22	14	6/-/-	Brentford A Consolid.	261—266	100—105	97½—103
734,920	,,	,,	11	6/3	Do. B New	204—209	97—102	101—101½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	85—90	86½—90
221,400	,,	Dec. 14	4	4%	Do. 4 p.c. Deb.	91—93	78—83	...
214,775	,,	Mar. 8	11	11%	Brighton & Hove Orig.	208—213	170—175	...
244,200	,,	,,	8	8½%	Do. A Ord. Stk.	154—159	128—130	...
1,272,500	Stk.	Feb. 22	5	5%	Bristol 5 p.c. max.	..	90—93	...
570,000	20	Mar. 22	12½	20/-	British	44—45	38—40	...
10,000	10	Dec. 29	—	7/-	Do. 7 p.c. Pref.	..	12—13	...
120,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	88—90	75—80	...
280,535	,,	Dec. 29	4	4%	Buenos Aires 4 p.c. Deb.	85—87	55—58	...
100,000	10	Nov. 2	—	—	Cape Town & Dis., Ltd.	1½—2½	6½—7½	...
100,000	10	Oct. 19	—	—	Do. 4½ p.c. Pref.	4—6	6—7	...
100,000	Stk.	Dec. 29	4½	—	Do. 4½ p.c. Deb. Stk.	70—75	72—77	74½
237,860	,,	,,	—	7½%	Cardiff 7½ p.c. Deb.	..	107—112	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	Mar. 8	5/9/4	60/-	Commercial 4 p.c. Stk.	106—108	96—99	97½
560,000	,,	,,	5½	60/-	Do. 3½ p.c. do.	103—105	96—99	...
475,000	,,	Dec. 14	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	55—60	58
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	25—30	26—29½
200,000	,,	Dec. 14	7	4%	Do. 7 p.c. Pref.	115—118	55—60	...
660,000		Mar. 8	—	6%	Croydon sliding scale.	..	100—103	101¼—102½
284,975		,,	—	5%	Do. max. div.	..	82—85	83—83½
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123—125	..	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	..	...
209,000	,,	Apl. 5	—	5%	East Hull 5 p.c. max.	..	..	...
2,002,180	10	Jan. 25	10	5/0	European, Ltd.	17½—18	8½—9½	8½
16,146,120	Stk.	Feb. 8	4/17/4	52/-	Gas Light { 4 p.c. Ord.	98—102	97—99	97⅝—99
2,600,000	,,	,,	3½	35/-	Gas Light { 3½ p.c. max.	76—79	65½—67½	66—66½
4,062,235	,,	,,	4	4%	Gas Light { 4 p.c. Con. Pref.	96—99	76—80	78½—80
4,761,930	,,	Dec. 14	3	3%	Gas Light { 3 p.c. Con. Deb.	72½—74½	61—64	62—63
130,000	,,	Dec. 11	10	10%	Coke { 10 p.c. Bonds	..	..	...
—	—	—	—	—	Coke { 7½ p.c. Ilford Deb	..	..	...
82,500	,,	Mar. 8	5	65/7½	Hastings & St. L. 5 p.c.	..	92—97	...
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87—89	75—78	...
70,000	10	May 18	11	7½%	Hongkong & China, Ltd.	16½—16¾	6—7	...
86,600	Stk.	Mar. 8	9	9½%	Hornsey 7 p.c.	..	135—140	...
1,976,000	,,	Nov. 16	9	£5	Imperial Continental	150—160	165—170	166—168½
404,800	,,	Feb. 8	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	75—78	...
235,242	,,	Mar. 8	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	..	..	...
600,000	,,	Mar. 22	—	7%	,, 7 p.c. Pref.	..	102—104	104
165,736	,,	Feb. 22	7/5/6	80/-	Maidstone 5 p.c.	..	107—112	110½
63,480	,,	Dec. 29	—	3%	Do. 3 p.c. Deb.	..	53—58	...
75,000	5	June 29	6	6%	Malta & Mediterranean Met. of Melbourne { 4½ p.c. Deb.	4⅛—4½	3⅛—3½	...
100,000	100	Apl 5	4½	4½%	Monte Video, Ltd.	99—101	97—100*	...
541,920	Stk.	Nov. 30	4	4%	Newcastle & Gatsh'dCon.	11½—12	54—59	56
1,875,892	,,	Feb. 22	4½	5½%	Do. 4 p.c. Pref. Stk.	98½—99½	81—82	...
850,166	,,	,,	—	4%	Do. 3½ p.c. Deb.	..	76—78	...
529,705	,,	Dec. 29	3½	3½%	North Middlesex 10 p.c.	82—83	68—69	...
15,000	10	Aug. 26	—	7/6	,, ,, 7 p.c.	..	..	...
55,940	10	Mar. 8	7/14/0	7/8⅝	Oriental, Ltd.	14—15	10⅛—11⅛	...
300,000	Stk.	Nov. 30	8	8%	Piym'th & Stonh'se 5 p.c.	117—122	97—102	...
188,120	Stk.	Dec. 29	—	72/6	Portsea Island, B	..	94—99	...
60,000	50	Mar. 8	13	65/-	Do. C	128—131	98—103	...
100,000	50	,,	12	60/-	Primitiva Ord.	118—121	95—102	...
290,069	5	—	8	—	Do. 5 p.c. Pref.	5⅛—6	⅞—1⅛	9/6—11/6
499,960	5	—	5	—	Do. 4 p.c. Deb.	4⅛—5	1⅛—2⅛	37/6—40/6
521,600	100	Nov. 30	4	4%	Do. ,, ,, 1911	91—93	70—73	...
600,000	Stk.	Jan. 25	4	4%	River Plate 4 p.c. Deb.	..	55—58	...
346,198	,,	Dec. 29	4	4%	San Paulo { 6 p.c. Pref.	85—87	55—58	...
150,000	10	Mar. 22	6	6%	San Paulo { 5 p.c. Deb.	10½—11	5⅛—6	5⅛
125,000	50	July 3	5	5%	Sheffield A	47—49	36—38	...
135,000	Stk.	Mar. 22	10	5%	Do. B	223—224	95—97	...
209,984	,,	,,	10	5%	Do. C	222—224	95—97	...
525,500	,,	,,	10	5%	Shrewsbury 5 p.c.	220—222	95—97	...
133,201	Stk.	Sept. 15	4	4%	South African	..	..	...
90,000	10	Nov. 2	9	7%	South Met. Ord.	10½—11⅛	7—9	...
6,609,895	Stk.	Feb. 22	5/4/0	60/-	Do. Red. Pref.	111—113	98—101	97½—99
250,000	,,	Jan. 11	—	5%	Do. 3 p.c. Deb.	..	96—98	...
1,895,445	,,	,,	3	3%	Do. 6½ p.c. Deb.	72½—74½	61—63	62
734,000	,,	Mar. 8	—	6½%	South Shields Con. Stk.	157—159	105—107	106—107
91,500	,,	Feb. 22	8½	8½%	S'th Suburb'n Ord. 5 p.c.	114—116	115—117	...
1,087,795	,,	,,	6	6%	Do. 5 p.c. Deb. Stk.	116—118	98—101	...
368,837	,,	Dec. 29	5	5%	Southampton Ord.	99—102	93—98	...
647,740	,,	Nov. 2	5	7%	Do. 4 p.c. Deb. Stk.	..	85—88	...
121,275	,,	Dec. 29	4	4%	Swansea 7 p.c. Pref. Stk.	..	68—73	...
250,000	,,	Mar. 8	—	70/-	Do. 6½ p.c. Deb. Stk.	..	102¼—104½	103½—104
200,000	,,	Dec. 29	—	6½%	Tottenham District { A 5 p.c.	..	103—105	...
120,000	,,	Feb. 22	—	7½%	Tottenham District { B 3½ p.c.	135—138	123—128	...
782,275	,,	,,	6	6%	Tottenham District { 4 p.c. Deb.	115—117	102—105	101½—103
181,255	,,	Dec. 14	4	4%	Tynemouth 5 p.c. max.	87—89	75—80	...
258,251	Stk.	Mar. 22	5	5%	Wandsworth, Wimbledon, and Epsom—	108½—109	90—92	91
30,000	,,	Feb. 22	8½	87/6	Wandsworth A 5 p.c.	151—156	130—135	...
255,636	,,	,,	6½	72/6	Do. B 3½ p.c.	129—134	115—120	...
108,375	,,	,,	—	61/3	Do. C.	..	100—105	...
140,865	,,	,,	—	61/3	New Ordinary	..	100—105	102—102½
352,000	,,	,,	6½	68/9	Wimbledon 5 p.c.	117—122	109—114	...
98,000	,,	,,	6½	73/9	Epsom 5 p.c.	121—126	115—120	...
88,416	,,	Dec. 29	3	3%	3 p.c Deb. Stk.	66—69	56—59	...

* Ex Div.

STOCK AND SHARE ISSUES.

(See also p. V.).

By Order of the Directors.

NEW ISSUE OF DEBENTURE CAPITAL.

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The Net Revenue of the Company last Year was £50,863; and as the Interest on the Loan Capital, including the present issue, only requires £5621, it is covered nine times over.

Prospectus and Form of Tender, which latter must be sent in by 11 o'clock on Friday, the 27th of April, may be obtained of Messrs. A. & W. Richards, 37, Walbrook, E.C. 4.

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Imperial Continental Association Meeting Postponed.

The following appeared among the City Notes in "The Times" last Friday: The total sum which has been received by the Imperial Continental Gas Association as a first payment on account of the £1,600,000 due to the Association under their German claims award is £238,698 (this sum including £49,750 representing liquidation expenses). Since the Board arrived at the decision to make a special distribution of 12 p.ct. to the ordinary stockholders out of this instalment, an ordinary and debenture stockholder in the Association has applied for an injunction against the Association to prevent the Directors from making this distribution. The case will be heard on April 23; and in the hope of a decision being shortly given, the general meeting (which had been fixed for May 9) has been postponed to May 30. Should no decision of the Court have been reached before the latter date, only a resolution for payment of the ordinary dividend can be passed. The Association's debenture stock carries interest at the rate of 3½ p.ct., and is redeemable at 105 p.ct. The present price is 77. The amount outstanding is £404,800; and the question at issue is whether the debenture holders have a prior claim to be repaid out of the proceeds of the liquidation of the German assets.

Proposed Brentford and Harrow Amalgamation.—The Harrow and Stanmore Gas Company are calling a special meeting of their shareholders on Monday, April 30, to consider a proposal for the sale of the undertaking to the Brentford Gas Company. The Directors of the Companies have been in negotiation for some time, and will, it is understood, submit an agreement.

Boston Gas Price Reduction.—A reduction in the price of gas is announced by the Boston (Lincs.) Gas Company, this being rendered possible by the more economical working of the plant, owing to the introduction of new machinery. From and after the reading of the ordinary meters in May next, a discount of 10d. per 1000 c.ft. will be allowed, instead of 5d. as at present, provided the accounts are paid during the month in which they are rendered—thereby reducing the net price to 4s. 8d. per 1000 c.ft. A corresponding reduction in price will be given to prepayment consumers from the date of the next collection.

Dudley Public Lighting.—The Streets, Tramways, and Lighting Committee of the Dudley Town Council have recommended that a contract be entered into with the Town of Dudley Gas Light Company for a period of five years, determinable by either party at the end of three years on six months' previous notice, for lighting and maintaining 470 street lamps. Of these, 235 must be alight from one hour after sunset to one hour before sunrise, and the remaining 235 from one hour after sunset to midnight. The cost is to be at the rate of £4 2s. per single-burner lamp per annum, based on the present price of gas for private lighting of 4s. 9d. per 1000 c.ft.; the price per public lamp to be varied by one shilling in respect of each penny per 1000 c.ft. alteration in the charge for private lighting.

Split Pendant Causes an Explosion.—A gas explosion occurred at a private house, No. 178, Nechells Park Road, Birmingham, last Sunday week shortly after nine o'clock. A good deal of damage was done; and Alfred Dorman was injured; being burned on the neck and arms. A fire had been lighted in the sitting-room; and on the door of the adjoining parlour being opened, there was a loud explosion owing to a leakage of gas from a defective pendant in this room. The window was wrecked and the door blown off its hinges; and some damage was caused to the furniture by fire. The leakage in the gas pendant was due to the splitting of the down rod, which had been brazed. Mr. R. J. Rogers, Superintendent of the Fittings Department of the Birmingham Corporation Gas Department, urges that gas consumers when purchasing new fittings should insist on obtaining those which have been manufactured from solid drawn tubes.

Lamp Controllers at Middlesbrough.—The Middlesbrough Corporation are considering the advisability of the adoption of clockwork controllers on street lamps on a larger scale than at present. The Gas Manager (Mr. C. F. Blincoe), in a report to the Watch Committee, stated that there are now 415 lamps fitted with clockwork controllers. Comparing the two systems, there was little or no economy effected in the consumption of gas by the clockwork system, as whatever advantage might be gained by a closer approximation to lighting and extinguishing times was nullified by the fact that each lamp required a by-pass light which burned continuously. The economy of the controller system lay in the displacement of labour; and it was principally in this direction that economy might be sought. There were about 1800 lamps in use, and the earlier lighting which was necessary in some cases meant that the whole were lighted about thirty-seven minutes earlier than they might be if they could be lighted simultaneously. This earlier lighting involved a consumption of about 5000 c.ft. of gas, costing 12s. 6d. a day. The Gas Manager is to submit a fuller report in regard to the saving from clockwork controllers for the lamps in the whole or greater portion of the town.

Bridlington Gas-Works Ownership.—At a meeting of the Bridlington Apartment House Keepers' Association last week, a resolution was passed urging the Town Council not to purchase the Bridlington Gas Company's undertaking, as was under contemplation. It was suggested that the Company is one of the most successful and efficient in the country, that its services are perfectly satisfactory, and that if the municipality get hold of the works the price of gas will very soon be doubled.

Conway Town Council and Late Payers.—The Conway Town Council are much concerned at the dilatoriness of some of the ratepayers in paying their gas accounts, and have come to a decision that it is time to devise some means of making prompt payment more compulsory. With this object in view, the Finance Committee have recommended that slot meters be substituted for the ordinary meters in the houses of the recalcitrant consumers; and the Town Council have endorsed the recommendation.

Ellesmere Gas-Works.—At a special meeting of the Ellesmere Urban District Council last week, to consider the gas question, Mr. C. Kesterton moved that an expert be engaged to advise the Council fully as to the undertaking. He said this was one of the recommendations of the Gas Committee which had practically been agreed upon, only that the time when the examination should take place had been put off until the summer. Now it had been proved that the matter was one of urgency, there ought to be no hesitation about engaging an expert. This was carried.

Low Temperature Construction Company.—We are informed that the Low Temperature Construction Company, Ltd., operating the development works at Barugh, near Barnsley, have closed-down part of the plant temporarily. This portion of the plant has operated continuously and successfully since August, 1920, and having proved the commercial value of the low-temperature process for the production of "Coalite" tar oil, and rich gas, it was decided to stop work and undertake examination of the various parts of the plant with a view to studying its durability. So far the examination has shown the plant to be in good order. During the continuous run of the plant completed in 1921, the Company have produced and sold several thousand tons of "Coalite," for which there was an increasing demand, which it was impossible to fill.

Birmingham Gas-Meter Testing Committee.—The Birmingham Magistrates are responsible for gas meter testing in the city; and at a meeting of the Justices last Thursday, a proposal was made that any Justice who is a member of the City Council should not be eligible for election as a member of the Gas-Meter Testing Committee. This proposal drew a protest from Alderman J. V. Stevens (the one member of the Committee affected by the resolution). He argued that he was the only one of the five who understood the mechanism of a gas-meter, and that a member, even if he were on the Gas Committee of the City Council, could do nothing to prejudice either one interest or another. The proposal seemed to point directly at himself. Sir John Barnsley said he was sorry Alderman Stevens had taken the matter in that way, because no one was anxious to lose his services on any committee on which he sat. There was not the slightest personal reflection upon him. But it seemed a fair and impartial thing that anyone who sat on the Gas-Meter Testing Committee, who were between the producer and the consumer, should not be a member of the City Council—the producer. An amendment to refer the proposal back was negatived.

At a recent local auction sale, £340 of ordinary stock in the Chester United Gas Company realized £340, and £200 of similar stock was sold for £195.

The Beverley Corporation Gas Committee have reduced the price of gas, from March 25 last, by 5d. per 1000 c.ft. The East Ardsley Gas Light Company, another Yorkshire undertaking, have lowered their gas 2d. per 1000 c.ft., as from April 1—the new price being 4s. 6d.

A deputation from Leeds, comprising the Lord Mayor (Alderman F. Fountain), Alderman C. H. Wilson (Chairman of the Finance Committee), Alderman W. Penrose Green (Chairman of the Gas Committee), Alderman G. Ratcliffe (Deputy-Chairman of the Gas Committee), Alderman G. Thaxton, Councillors H. Noble, A. E. Wilkinson, and H. Churton, together with Mr. C. S. Shapley (Engineer and General Manager of the Leeds gas undertaking), visited the new gas-works equipment of the Manchester Corporation at Bradford Road, to inspect the latest systems of carbonization there.

Mr. W. B. M'Lusky, Engineer and General Manager of the Halifax Corporation Gas-Works, who is himself a Rotarian, addressed the Huddersfield Rotary Club last week on "Artificial Lighting," and reviewed his subject from the old days of rush-lights, torches, and candles, through the oil-lamp stage, down to gas and electric lighting. Speaking of the future, Mr. M'Lusky opined that gas-works and electricity stations originally established for the purpose of artificial lighting, would continue to meet this demand, but the important business would be the supply of energy for cooking, heating, and power.

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